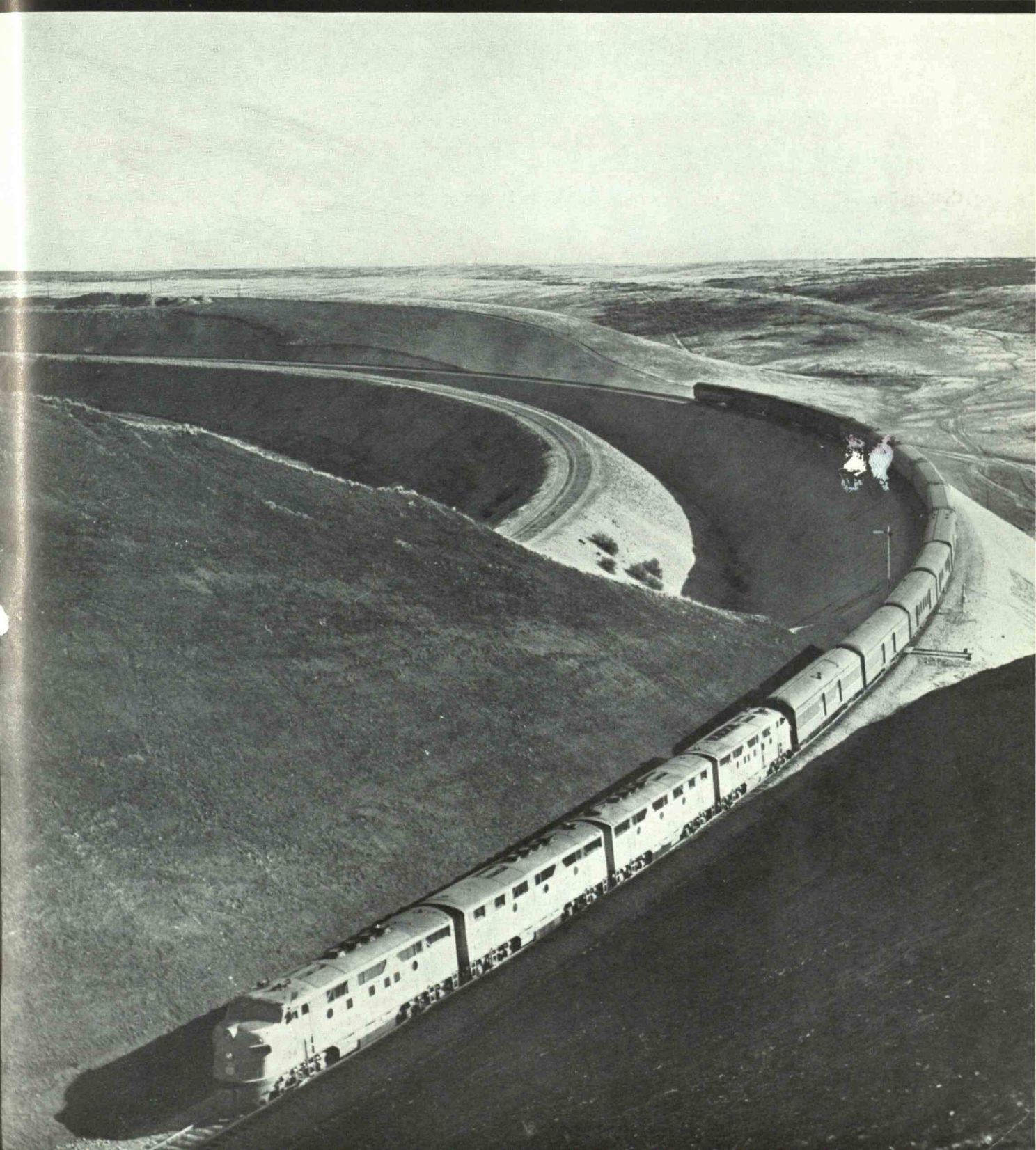


# TECHNOLOGY

## REVIEW *January* 1950

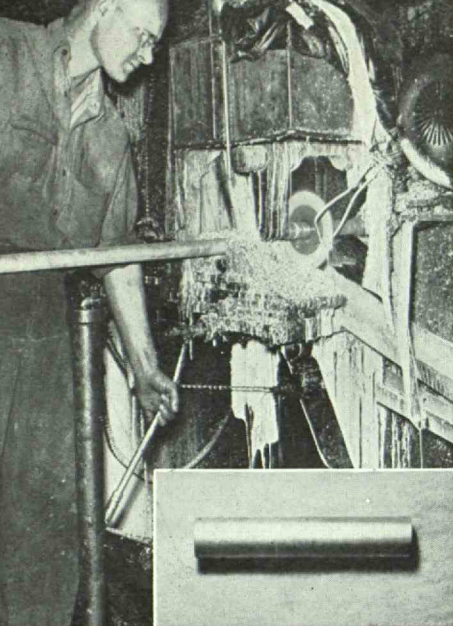


# technology review

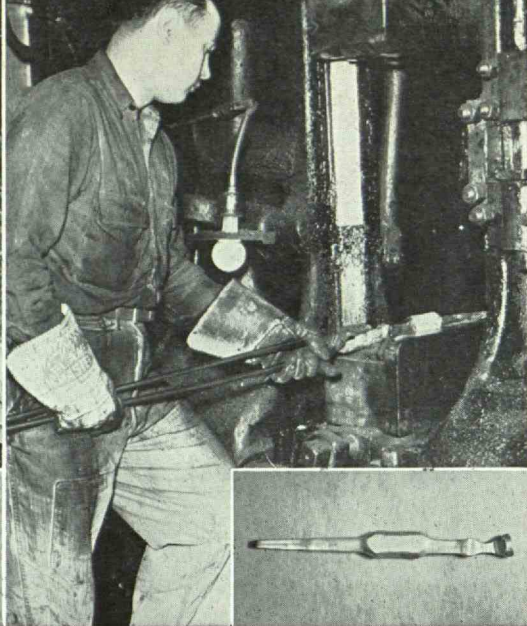
Published by MIT

This PDF is for your personal, non-commercial use only.  
Distribution and use of this material are governed by copyright law.  
For non-personal use, or to order multiple copies please email  
[permissions@technologyreview.com](mailto:permissions@technologyreview.com).

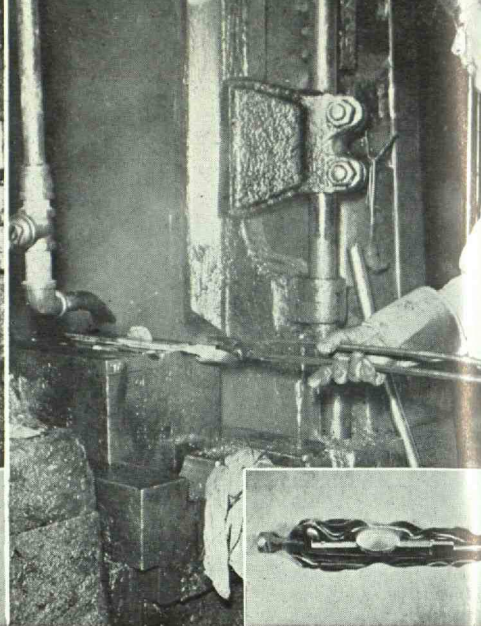




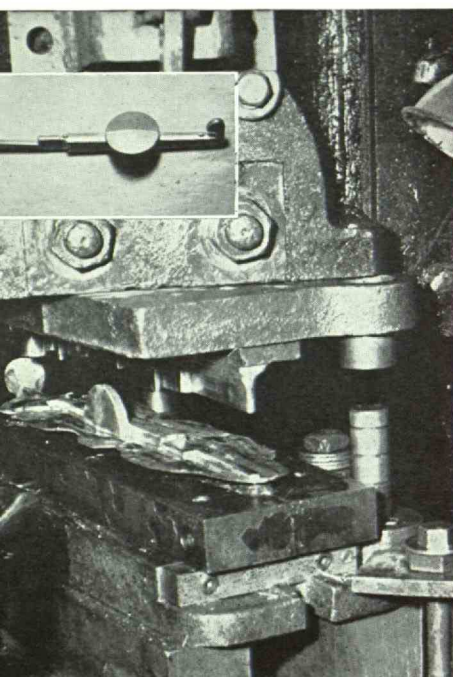
Cutting Bar



Lengthening and Shaping



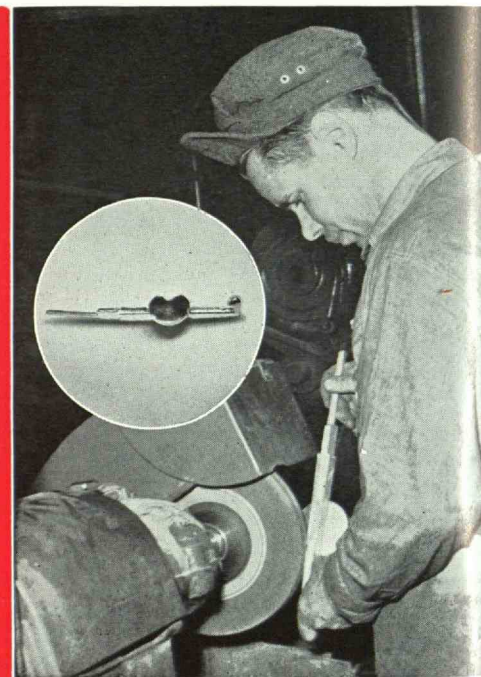
Shaping to the Die



Trimming the Flash

# FORGING ALUMINUM

into  
Pressure Cooker Tops



Finishing and Polishing

## The Harvey Metal Corporation

HAROLD B. HARVEY '05

*Engineers and Manufacturers*

74th Street and Ashland Avenue

Chicago 36, Illinois

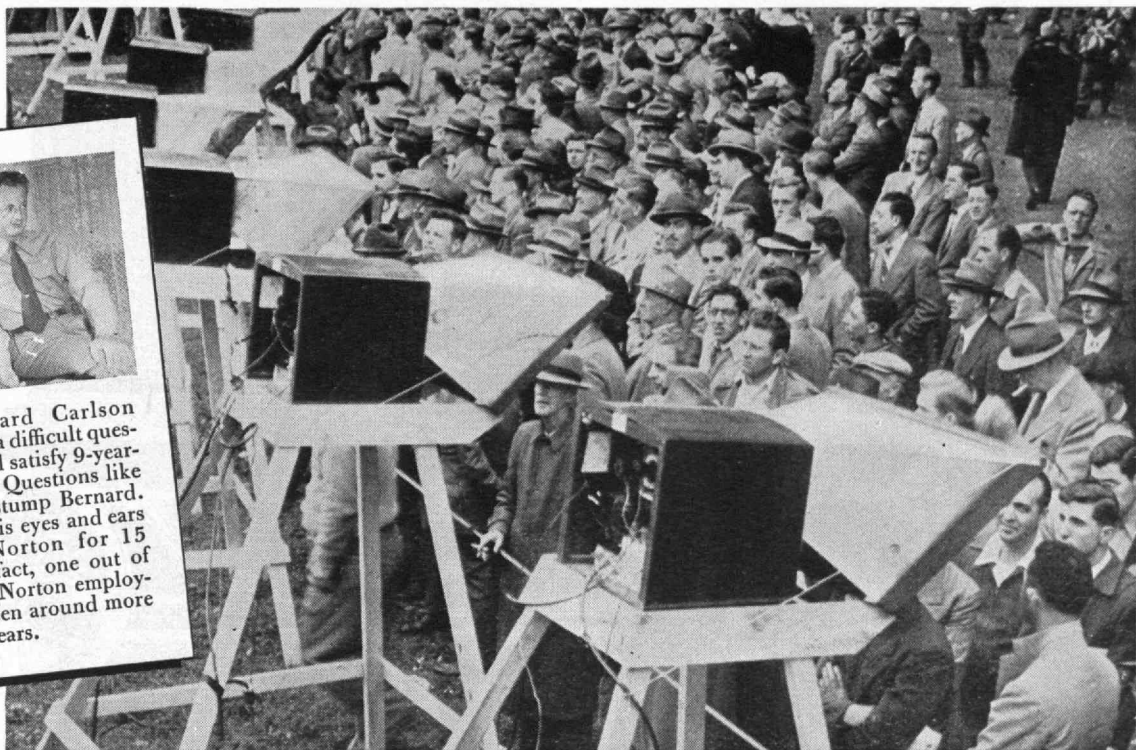
FORGINGS IN ALUMINUM — BRASS — BRONZE — COPPER — MAGNESIUM — MONEL — ALLOYS

MACHINING FACILITIES





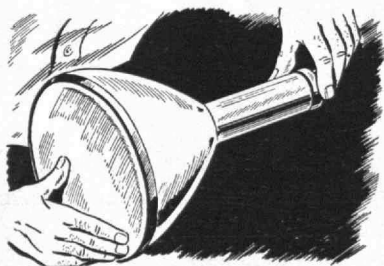
How Bernard Carlson might duck a difficult question and still satisfy 9-year-old Jackie. Questions like this don't stump Bernard. He's had his eyes and ears open at Norton for 15 years. In fact, one out of every two Norton employees has been around more than 10 years.



News photo of crowds watching television on Boston Common.

## BUT, DAD, WHAT MAKES TELEVISION SO CLEAR?

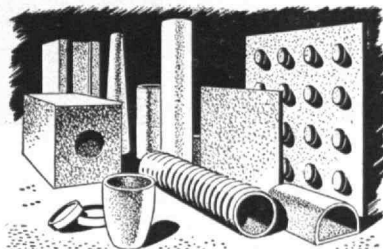
"Lots of things, Jackie! But mostly brains. The brains of men who know how to make electrons behave in tubes. Electrons are tiny particles of electricity. They're boiled out of metal wires by heating units. Much the same way as an electric stove boils water. But if the heating unit isn't right, everything goes wrong."



"The tube people are smart, son. They make sure the heating units give off the right heat and last longer by coating them with a fine Norton refractory. Alundum 38900 grain, we call it. It's so fine that ten grains end to end equal the thickness of a piece of paper."



"Alundum refractory grain is great stuff. Its melting point is 2015°C. That's real hot! Made into corrugated baffle plates, it doubles the efficiency of enameling ovens. That's why the surfaces of such things as refrigerators and electric stoves come so hard and smooth."



"Some people know Norton only as the world's largest maker of grinding wheels and machines, Jackie. But refractories in many sizes, shapes and materials are important Norton products, too. They're used in kilns, furnaces and ovens whenever industry wants to get the most out of high temperatures... safely."



"So, you see, son, from television tubes to refrigerators, Norton Products help make all kinds of products better. That's why the experienced heads and willing hands that make up the Norton team try a little harder to make Norton products better."

# NORTON

TRADE MARK REG. U. S. PAT. OFF.

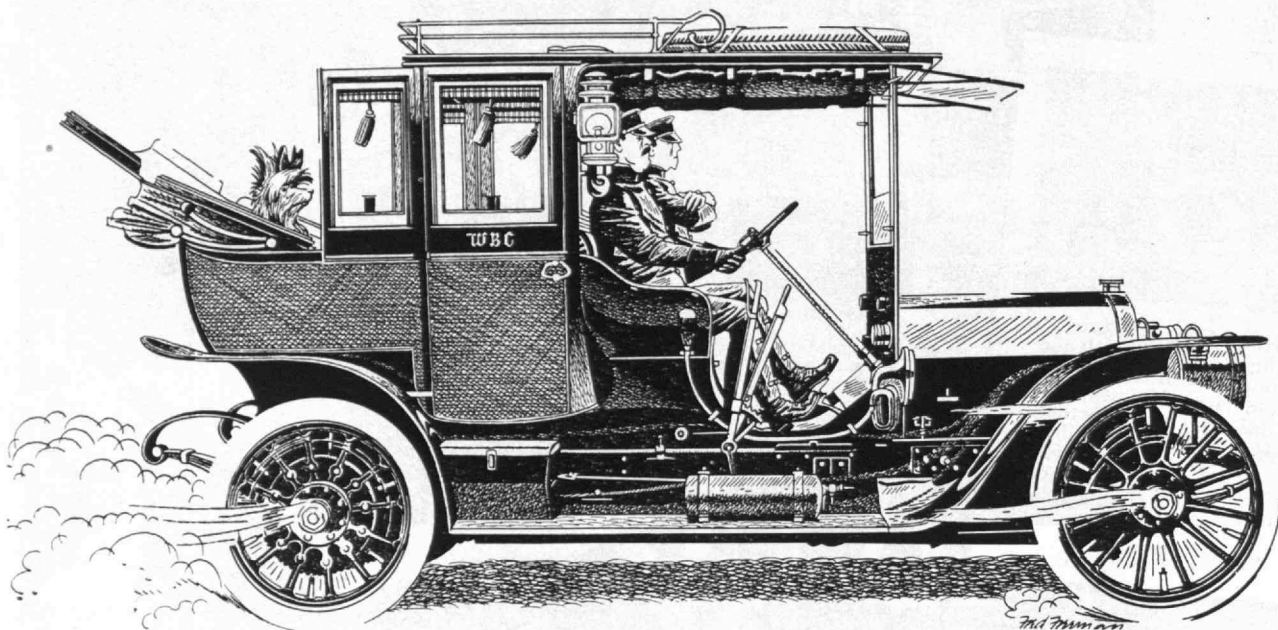
*Making better products to make other products better*



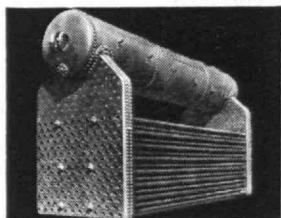
**NORTON COMPANY, WORCESTER 6, MASSACHUSETTS**

BEHR-MANNING, TROY, N. Y. IS A DIVISION OF NORTON COMPANY





## Boilers go out of date too!



As good as new isn't good enough when it comes to boilers. For boilers become obsolescent long before they wear out. And when you consider today's cost of fuel and labor, you'll find that gains in operating efficiency make new steam generating equipment a profitable investment.

Boiler obsolescence, tremendously accelerated in the past twenty-five years, is the result of technological improvements that have resulted in greatly increased efficiency and lower operating costs. Combustion Engineering—Superheater has long been in the forefront of steam generating and fuel burning progress. Combustion experience is yours for the asking in helping to solve today's most difficult problem — the diminishing margin between lower selling prices and high costs. A letter from you will bring an experienced C-E sales engineer to your office.

B-352

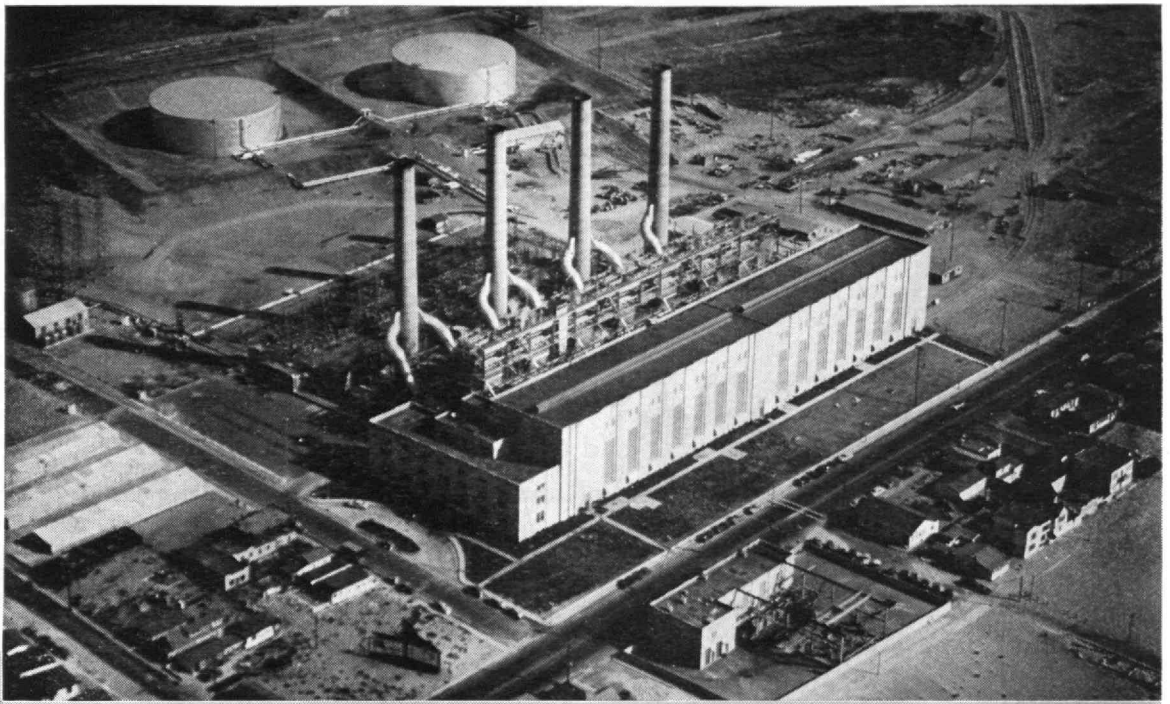


**COMBUSTION ENGINEERING—  
SUPERHEATER, INC.**

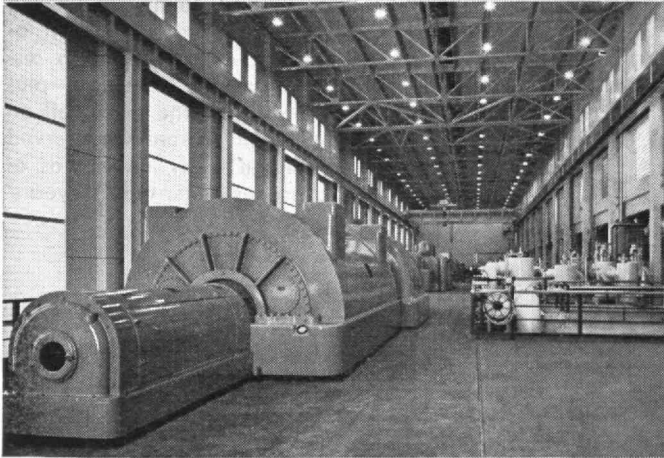
A Merger of Combustion Engineering Company, Inc. and The Superheater Company

**200 Madison Avenue • New York 16, N. Y.**

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT



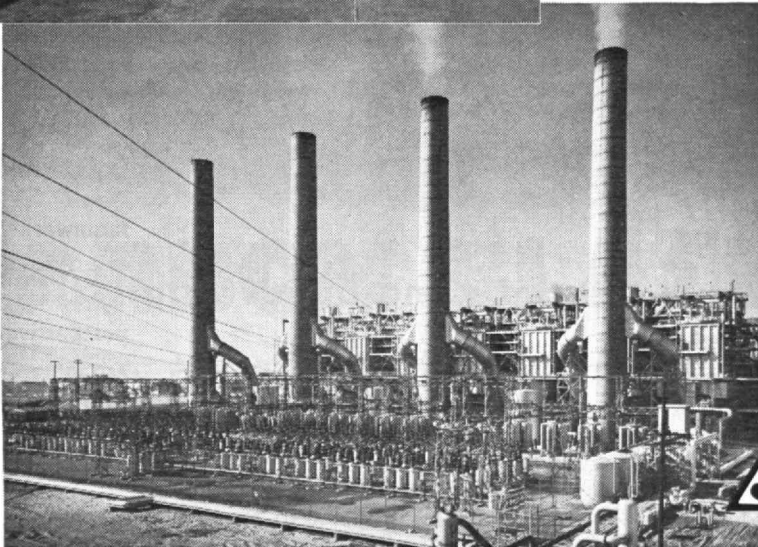
## HELPING TO MAKE THE WONDERS *of* SO. CALIFORNIA *more wonderful*



The 280,000 kw Redondo Steam Station was constructed to keep pace with the rapidly growing power demands of this region. Semi-outdoor design combines economy of construction with operating comfort and convenience and the entire structure has been built to resist the stress of possible earthquake shock. Unique is the provision for control of marine growth through thermal shock during periodic reversal of salt water flow

in the two 2,000 foot intake and discharge tunnels which obtain condenser circulating water from the Pacific Ocean.

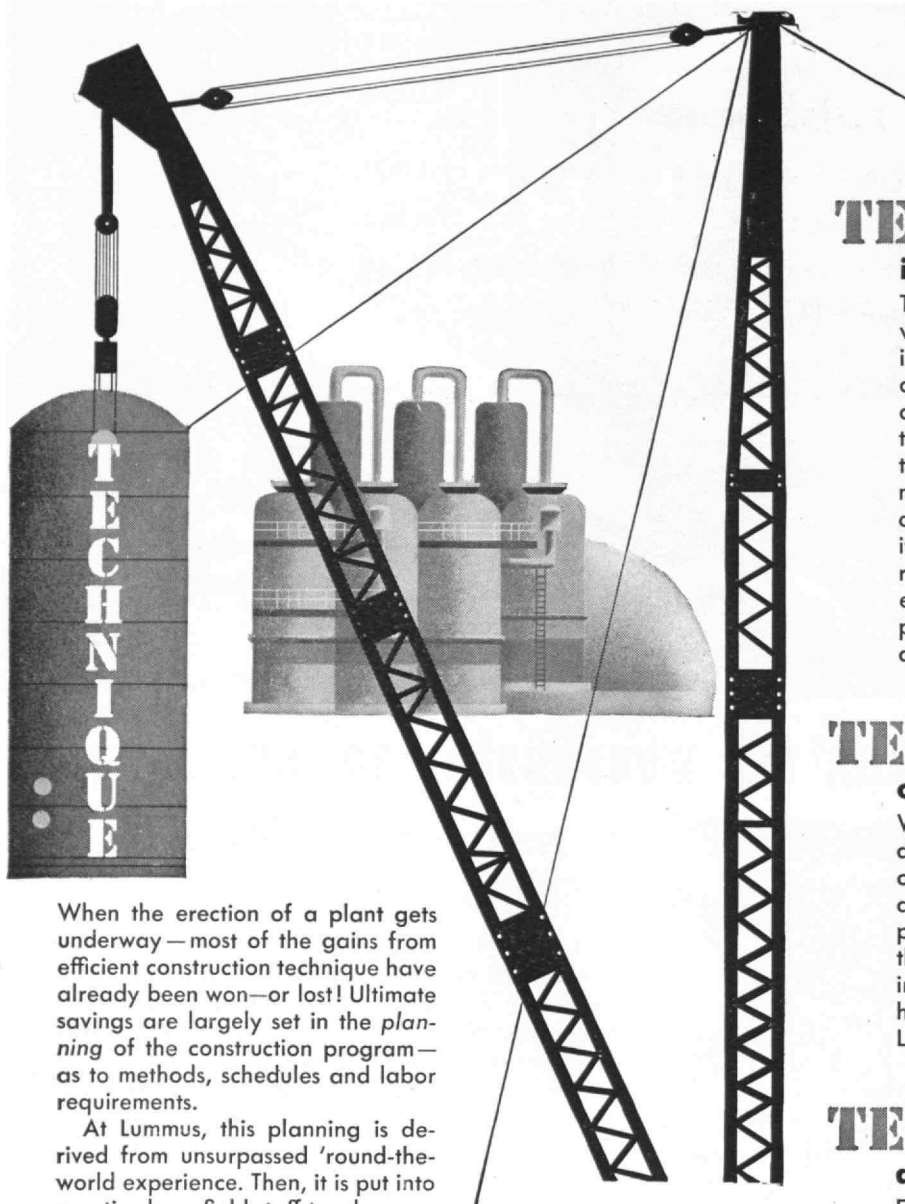
Stone & Webster Engineering Corporation designed and constructed the Redondo Steam Station for Southern California Edison Company.



# STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.





## TECHNIQUE

### in planning

The full effect of detailed planning in advance of actual construction has been realized in foreign work where local facilities are at a minimum. It called for scheduled arrival of tools and materials, periodic estimates of manpower requirements and the preplanning of specific procedures for materials handling and heavy lifts. Economy in requirements for construction facilities, tools and equipment by preplanned re-use at various construction stages is one example. The selection of a staff with experience permitting effective reassignment as the job progresses is another.

## TECHNIQUE

### on the job

What makes it possible to move a 150-ton derrick intact from one tower-erection location to another, as contrasted to disassembly and reassembly? Planning—plus practical experience of the field staff on the job! Lummus field personnel has served in some 15 foreign fields, as well as at home, and averages better than 10 years' Lummus experience.

## TECHNIQUE

### as to costs

From an analysis of unit erection costs in which every man-hour is estimated in advance, Lummus lays the groundwork for continuing cost control. Periodic reports, detailing costs and work-progress, permit evaluation of all phases of the job from start to finish.

When the erection of a plant gets underway—most of the gains from efficient construction technique have already been won—or lost! Ultimate savings are largely set in the *planning* of the construction program—as to methods, schedules and labor requirements.

At Lummus, this planning is derived from unsurpassed 'round-the-world experience. Then, it is put into practice by a field staff to whom so-called "unpredictables" are old and familiar.

Sound technique, as Lummus applies it, means a sound night's sleep for those we serve who shoulder the responsibility.

### THE LUMMUS COMPANY

420 Lexington Avenue, New York 17, N. Y.

# LUMMUS

CHICAGO—600 South Michigan Avenue, Chicago 5. Ill.

HOUSTON—Mellie Esperson Bldg., Houston 2, Texas

The Lummus Company, Ltd.

525 Oxford St., London, W-1, England

Société Française des Techniques Lummus

39 Rue Cambon, Paris 1er, France

Compañía Anónima Venezolana Lummus

Edificio "Las Gradillas"

Esquina Las Gradillas, Caracas, Venezuela



designs and builds with **TECHNIQUE**

teamwork

perspective

economy

fulfillment

resourcefulness

## **... reinforce rubber**

Special Cabot blacks add the abrasion resistance, resilience, low heat build-up and flex-cracking resistance to help make the long-wearing rubber products you demand.

## **... make paints blacker**

Other Cabot blacks add deep blackness to paints and lacquers, and are known for their easy wetting and dispersion in every type of vehicle.

## **... inks jetter**

Certain Cabot blacks add the color strength, flow properties, blue tone, ease of dispersion, and low oil absorption which make ink-makers prefer Cabot.

## **... paper, plastics, better**

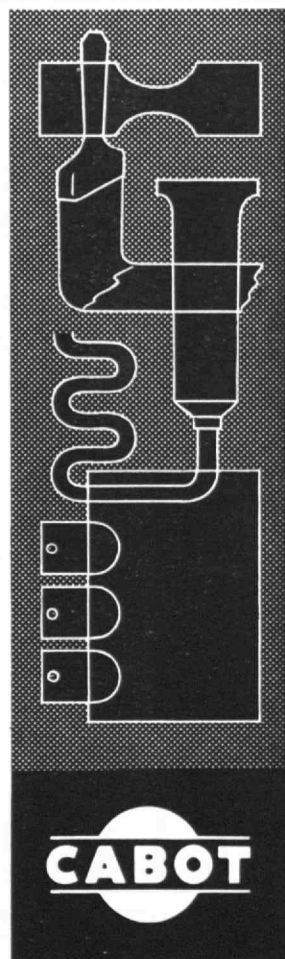
Still other Cabot blacks give the particular jetness, strength, or electrical conductivity most desired by the paper maker. In plastics, Cabot blacks serve both as coloring pigment and filler.

GODFREY L. CABOT, INC.

77 FRANKLIN ST., BOSTON MASS.

**cabot**  
**CARBON BLACKS**

*Your preference for constantly uniform, highest quality rubber, paint, ink, paper and plastics products encourage manufacturers to specify Cabot carbon blacks as one of their most dependable raw materials.*





advanced  
design

for lowest  
real  
cutter cost

To help you take full advantage of more efficient machines and new materials, Brown & Sharpe engineers are constantly developing and testing new designs in cutters. In the development of the most practical cutters, diversified manufacturing in Brown & Sharpe's own plant provides an exhaustive proving ground. Modern Brown & Sharpe cutters have many features that permit highly efficient operation—they cost you less in the long run. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

*We urge buying through the Distributor*

**BROWN & SHARPE** 



## 1950 CALLS FOR QUALITY

Every manufacturer knows he is in a buyers market—you have got to be right to get the business.

Diefendorf gears on any machine you build can meet most exacting demands for quality in design, materials and workmanship.

Specification production only.

**DIEFENDORF GEAR  
CORPORATION**

Syracuse, New York

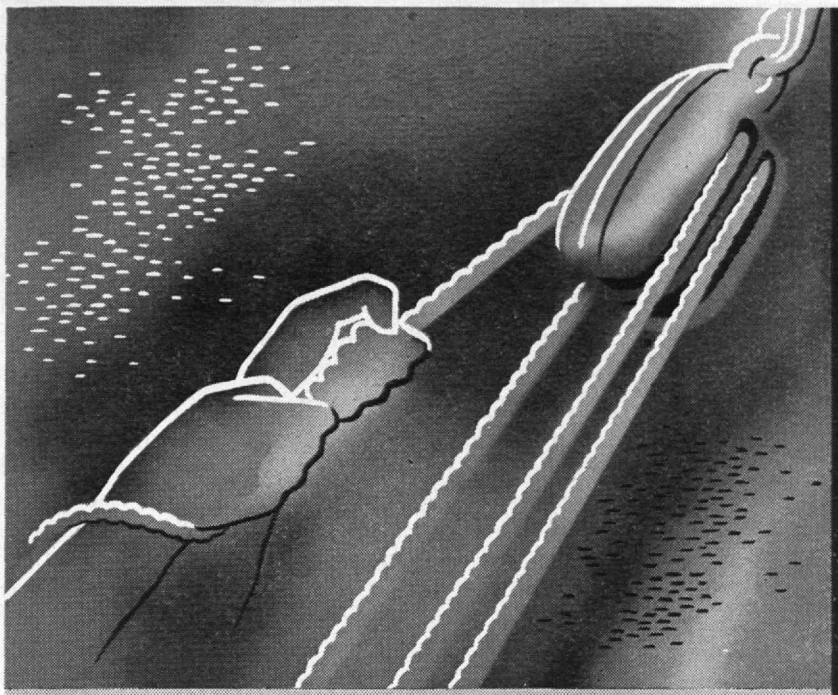
**DIEFENDORF**  
**G E A R S**

## THE TABULAR VIEW

**Initiative and Freedom.**—In a convocation for M.I.T. students on December 5, VANNEVAR BUSH, '16, (following the roles of his ancestors which included clergymen, bank presidents, and whaling captains) warned future scientists and engineers of the dangers of soft security, surrender of individual self-reliance, scramble for subsidy, and the decline of the pioneer virtues which produced men of greatness. It is the privilege of The Review to bring to its Alumni (page 147) this message from Dr. Bush who has served M.I.T. between 1919 and 1938 as a professor in the Department of Electrical Engineering, dean of the School of Engineering, and vice-president. Since 1938 Dr. Bush has been president of the Carnegie Institution of Washington. During World War II he was director of the Office of Scientific Research and Development, and subsequently was appointed by President Truman as head of the Research and Development Board of the National Military Establishment. Few others are so well fitted by experience, insight, and sympathetic understanding to inspire a return to the virtues of an earlier day and to demonstrate that, in economics and in government, as well as in science, no path leads to "something for nothing."

**Going Like Sixty.**—At decennial intervals, H. E. LOBDELL, '17, has taken a look at the speeds with which passenger trains operate. His current examination (page 149), emphasizing the progress which has been made since 1940, highlights the fast tempo of the present era, and on the basis of trends well established, records the passing of the puffing, snorting iron horse. As an ardent student of American railroad operation, Mr. Lobdell has ample opportunity to observe firsthand the workings of this form of transportation, for as executive vice-president of the Alumni Association, he travels annually many thousands of miles to cement good fellowship between the Institute and its Alumni in M.I.T. clubs throughout North America. Mr. Lobdell has been closely associated with The Review for more than a quarter of a century—as editor and now as its publisher.

**Twentieth Century Mid-Point.**—The influence which science and engineering have had in shaping our present mode of living is surveyed (page 156) by PAUL COHEN, '35, whose thumbnail sketch of significant progress during the past five decades has been prepared especially for this issue of The Review. No account of half a century of change in the United States would be complete without some record of the progress which we have made in international affairs, in redistribution of wealth, and in piling up a huge public debt, but Mr. Cohen limits his discussion largely to the overwhelming accomplishments in science and industrial technology. An editorial associate of The Review for more than a decade, Mr. Cohen is by nature an acute observer, by training a mechanical  
(Concluded on page 136)



## When sail trimming is required

No business can stay healthy without an occasional overhaul of its production set-up—particularly when a seller's market begins to quiver.

Molybdenum steels may be just what the doctor ordered to reduce production costs, and still maintain the product's reputation for consistent performance.

Send for our comprehensive 400-page book, free; "MOLYBDENUM: STEELS, IRONS, ALLOYS."

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS

**Climax Molybdenum Company**  
500 Fifth Avenue • New York City

# MOLY

® c4



## MARTIN-HUBBARD CORPORATION

*Engineering Consultants*

Computers — Servomechanisms

Instrumentation for Nuclear Research

Applied ultrasonic research and development

Design and construction of scientific instruments  
to your performance specifications

Complete engineering of original or unique electrical  
and mechanical devices and machinery

Technical reports

11 BEACON STREET

BOSTON 8, MASSACHUSETTS, U. S. A.

Telephone: CApitol 7-6990

"Cable Address MARHUB-Boston

**YOU ARE INVITED**

to address all inquiries  
for information about

**SUBMINIATURE AND SPECIAL PURPOSE TUBES**  
to the  
Special Tube Section

**RAYTHEON MANUFACTURING CO.**  
55 Chapel St., Newton, Massachusetts



Raytheon has especially designed and produced millions of special purpose tubes for non-entertainment applications such as in *Hearing Aids, Aircraft Control, Guided Missiles and Long-Life Industrial Apparatus*, so could doubtless

help you with your special tube requirements.

Over half a million Subminiature Tubes are carried in stock.

Sales engineering service is maintained in Newton, Chicago, Los Angeles and London.

## THE TABULAR VIEW

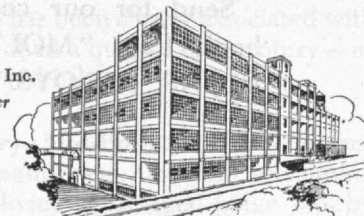
(Concluded from page 134)

engineer, and by inclination an interpretive writer on topics technological. Since his graduation from the Institute, Mr. Cohen has been, successively, an instructor in the Department of English and History at M.I.T., an engineer with the United Shoe Machinery Corporation, and now occupies an administrative and engineering position with the Sperry Gyroscope Company.

**Depletion of Natural Resources.** — The study of mineral depletion and metal supply which appears (page 158) in this issue of *The Review* was delivered by EVAN JUST at a symposium of the Institute's Department of Metallurgy some months ago. The inclusion of Mr. Just's study in the January issue is particularly appropriate, not only because the general theme of the issue is in the nature of a survey of our present world, but also because New York's current water shortage has drawn national attention to the need for conserving our natural resources. By training, Mr. Just is a geologist, having received his bachelor's and master's degrees in this field in 1922 and 1925 from Northwestern University and the University of Wisconsin, respectively. He became a petroleum geologist for the years 1922-1924 and again in 1928-1931. From 1925 to 1928 he was a geologist engineer and his explorations for bauxite, lead, and fluorspar took him to Brazil and Russia, as well as to various parts of the United States. He became assistant professor of geology and petroleum technology at the New Mexico School of Mines from 1931 to 1934, petroleum production engineer for the Carter Oil Company between 1934-1937, and secretary of the Tri-State Zinc and Lead Ore Producers Association between 1937 and 1942. Except for the past year when he was director of the Strategic Materials Division of the Economic Cooperation Administration, Mr. Just has been editor of the *Engineering and Mining Journal* since 1942.

Avon Allied Products Co., Inc.

E. H. Faile, Engineer



### What Avon Allied Products Co. said of our Service

"It becomes my pleasant duty to tell you of the most satisfactory way in which you executed this contract with us from every standpoint, and we were all greatly pleased at the workmanship, the speed, and the efficiency shown by your organization."

### W. J. BARNEY CORPORATION

FOUNDED 1917

101 PARK AVENUE, NEW YORK

**INDUSTRIAL CONSTRUCTION**

Alfred T. Glassett, '20, Vice President



## In safe hands . . . even at 60 below!

DO YOU REMEMBER when winter meant storing the family car till spring? Not so many years ago, a car owner's fear of an ice-shattered motor was a dread reality . . . if he *didn't* drain his radiator and store his car once cold weather hit!

What was needed—acutely—was an automobile anti-freeze that would prove always *dependable* yet *economical*. One that would hold up under any operating temperature. That wouldn't foam and boil away. That would resist rust and corrosion to the *nth* degree.

That's where Union Carbide *research* entered the picture. The result? "Prestone" anti-freeze. Since then this product—the first all-winter anti-freeze—has assured millions upon millions of motorists of ever-improved driving performance,

with assured safety . . . throughout the bitterest weather.

This is but one example of the way the people of Union Carbide are helping to better our daily living. And UCC stands ready to help solve other problems . . . wherever better materials and processes are needed.

**FREE:** If you would like to know more about many of the things you use every day, send for the illustrated booklet, "Products and Processes." It tells how science and industry use UCC's Alloys, Chemicals, Carbons, Gases and Plastics. Write for free Booklet 1.



# UNION CARBIDE

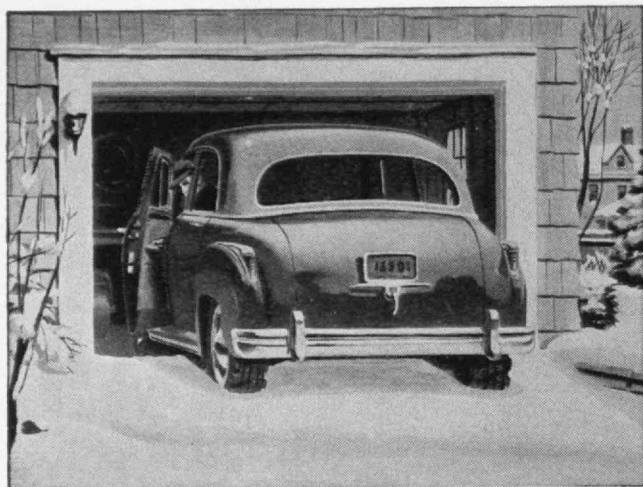
## AND CARBON CORPORATION

30 EAST 42ND STREET **UCC** NEW YORK 17, N. Y.

Trade-marked Products of Divisions and Units include

PRESTONE and TREK Anti-Freezes • NATIONAL Carbons • EVEREADY Flashlights and Batteries • ACHESON Electrodes  
SYNTHETIC ORGANIC CHEMICALS • PREST-O-LITE Acetylene • LINDE Oxygen • PYROFAX Gas  
BAKELITE, KRENE, VINYON, and VINYLITE Plastics • ELECTROMET Alloys and Metals • HAYNES STELLITE Alloys





Will you be stranded in your garage till the driveway is shoveled out? Not if you get Sure-Grips NOW!



With Sure-Grips, you won't have to worry about the slushy gutters. You'll be able to pull yourself out!



Sure-Grips will give you sure, steady going on snow-covered streets. You won't have to wait till the snow plow comes!



AND—Sure-Grips give super traction in mud! Studs are self-cleaning—mud, sand, gravel tend to funnel off!

## Why get stuck in snow or mud...get **SURE-GRIP TIRES *NOW!***

The time to get Sure-Grip Tires is right now—*before the going gets any tougher!*

The big studs on this famous Goodyear tire dig down deep, give you less slip, skid and wheelspin in soft snow, slush and mud.

Sure-Grips give you a smooth ride

when you hit stretches of good road. And the tread is *extra* thick and *extra* cut-resistant for longer wear!

You need only two Sure-Grips—one for each rear wheel. While on your car they save your regular tires! Play safe—see your Goodyear dealer *today!*

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Network

# GOODYEAR

MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND







Giles from Black Star

# THE TECHNOLOGY REVIEW

TITLE REGISTERED, U. S. PATENT OFFICE

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

## CONTENTS for January, 1950 Vol. 52 No. 3

ROUNDING THE HORSESHOE · *Photograph of the Union Pacific's Portland Rose by H. R. Griffiths* ..... THE COVER

"LET US HAVE PEACE" · *Photograph by Mayer from Black Star*  
FRONTISPIECE 140

THE ESSENCE OF SECURITY ..... BY VANNEVAR BUSH 147  
*In a convocation for M.I.T. students, Dr. Bush warns future scientists and engineers of the dangers of soft security*

THE FASTEST TRAINS ..... BY H. E. LOBDELL 149  
*Emphasizing events of the past decade, progress in the speed of railroad-passenger service during the Twentieth Century is examined*

THE TWENTIETH CENTURY MID-POINT ..... BY PAUL COHEN 156  
*An assessment of the overwhelming accomplishments of science and industrial technology during the Twentieth Century*

MINERAL DEPLETION AND METAL SUPPLY ..... BY EVAN JUST 158  
*Pollution of the atmosphere and water supplies held to be more threatening than plundering of minerals and metals*

THE TABULAR VIEW · *Contributors and Contributions* ..... 134

THE TREND OF AFFAIRS · *News of Science and Engineering* ..... 141

THE INSTITUTE GAZETTE · *Relating to the Massachusetts Institute of Technology* ..... 160

Editor: B. DUDLEY

Business Manager: R. T. JOPE

Circulation Manager: D. P. SEVERANCE

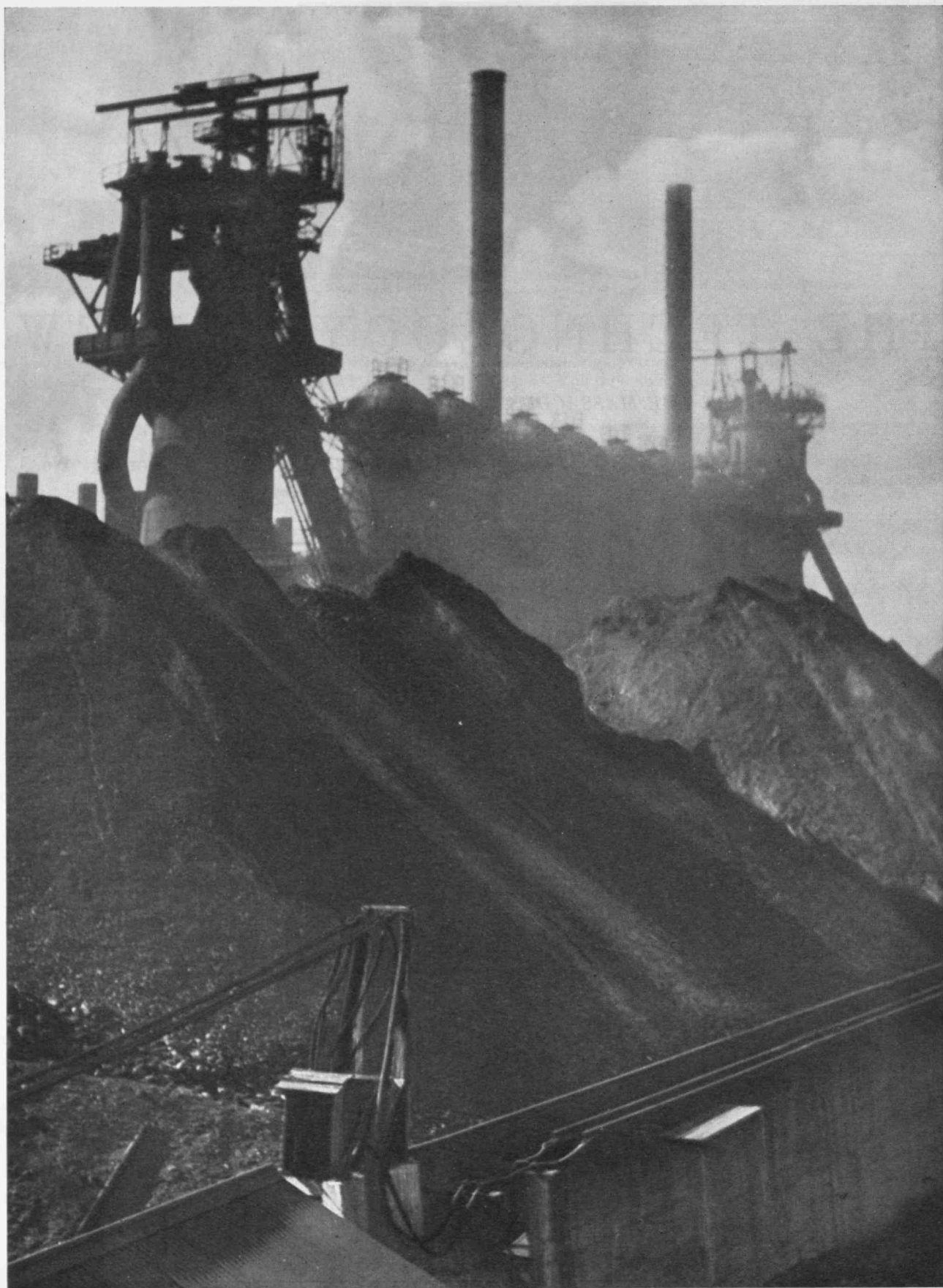
Editorial Associates: PAUL COHEN; J. R. KILLIAN, JR.; WILLY LEY; F. W. NORDSIEK; J. J. ROWLANDS; D. O. WOODBURY

Editorial Staff: RUTH KING; RUTH A. PHILLIPS

Business Staff: EILEEN E. KLIMOWICZ; MADELINE R. MCCORMICK

Publisher: H. E. LOBDELL

Published monthly from November to July inclusive on the twenty-seventh of the month preceding the date of issue, at 50 cents a copy. Annual subscription, \$3.50; Canadian and foreign subscription, \$4.00. Published for the Alumni Association of the M.I.T.: C. Adrian Sawyer, Jr., President; H. E. Lobdell, Executive Vice-president; Orville B. Denison, Horatio L. Bond, Vice-presidents; Donald P. Severance, Secretary-Treasurer. Published by The Hildreth Press, Inc., Bristol, Conn. Editorial Office, Room 1-281, Massachusetts Institute of Technology, Cambridge 39, Mass. Entered as second-class mail matter at the Post Office at Brattleboro, Vt. Application for transfer of second-class mailing privilege from Brattleboro, Vt., to Bristol, Conn., is pending. Copyright, 1950, by the Alumni Association of the Massachusetts Institute of Technology. Three weeks must be allowed to effect change of address, for which both old and new addresses should be given.



Henry M. Mayer from Black Star

*"Let us have peace."*

— Ulysses S. Grant

# THE TECHNOLOGY REVIEW

Vol. 52, No. 3



January, 1950

## The Trend of Affairs

### *A New Half Century*

**T**HIS month the usual survey of anniversaries, which has opened the Trend of Affairs in January issues for years, is omitted in favor of a group of feature articles providing the more extensive examinations which befit inauguration of a new half century. The Review offers a thumbnail sketch of technological progress since 1900 by Paul Cohen, '35; an examination of passenger train speeds for a like period by H. E. Lobdell, '17; a note of caution on depletion of our minerals and metals by Evan Just; and an inspiring article by Vannevar Bush, '16, evaluating our present socioeconomic position.

### *Utilizing Beet Sugar Waste*

**T**wo beet sugar factories in Ohio and one in Michigan are now using a new process of utilizing waste waters previously discharged into rivers and streams. The reclaiming process, developed by Erman A. Pearson, '47, in the Department of Civil and Sanitary Engineering under the supervision of Clair N. Sawyer, Associate Professor of Sanitary Chemistry, ideally meets the requirements for waste disposal, since it reduces a major source of stream pollution and simultaneously improves economy of plant operation. In fact, preliminary economic studies of the process indicate that the savings effected during the first year of operation are sufficient to amortize the capital investment for the necessary treating equipment. The process is being studied by the United States Public Health Service because of its promise in reducing stream pollution.

In the usual process, sugar is extracted by passing water through large vertical tanks packed with shredded beets. When most of the sugar has been removed, the remaining beet pulp is washed from the tanks, after which it is drained, pressed, dried in a gas-fired rotary kiln, and sold as cattle feed. The wash water used to displace the pulp, as well as that removed from the

pulp in the draining and pressing operations, is customarily discharged into streams. This waste water contains some sugar, considerable organic nonsugars both in solution and in suspension, and has a high bacteria count. For each ton of beets processed, yielding 250 pounds of refined sugar, the volume of waste water may be from 300 to 500 gallons, and it is often the most objectionable waste product that results from the process.

Re-use of the waste water by adding it to the fresh water used in the extraction process has not proved practical because the high bacteria content of the waste water causes fermentation with resultant generation of gas which greatly impedes circulation of the extracting liquid. In addition, fermentation destroys valuable sugar, thus reducing sugar yield. Furthermore, solids suspended or dissolved in the liquid interfere with circulation and, of course, necessitate additional processing in the treatment of the extract.

In the new process the waste water is treated with 35 to 45 parts (by weight) of chlorine per million parts of waste water, and its acidity is neutralized to maintain optimum pH by the addition of small amounts of lime. The chlorine destroys the bacteria and precipitates most of the organic nonsugars as well. It is then necessary only to provide tanks for coagulation and sedimentation of the solids, and the water is then ready to be added to the fresh water used for sugar extraction. The sediment can be removed to a storage lagoon for drying.

Besides eliminating a major source of stream pollution, the process improves plant economy by reducing the water needed for extraction by about 30 per cent and by increasing sugar yield from the beets. The recovery amounts to about four pounds of sugar for every ton of beets processed, or about 1.5 per cent. For a 1,000-ton mill, about two tons of sugar are saved per day which formerly were discharged into the river. Since there are about 80 sugar mills operating in the United States, the tonnage of sugar that can be saved annually is of considerable economic importance.

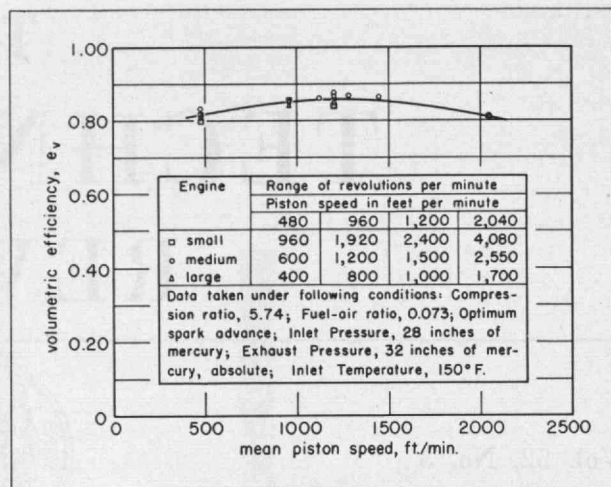


## How Do Engines Grow?

IN the Sloan Laboratories for Aircraft and Automotive Engines, research personnel are seeking fundamental answers to the question, "How do engines grow?" They hope to develop quantitative methods which will relate the various performance factors of such extremes as a one-sixth horsepower model airplane engine and a 10,000-horsepower Diesel engine.

Engines can be made to grow both by increasing the size of individual cylinders and by increasing the number of cylinders. Sloan Laboratory personnel, under the general direction of Professor C. Fayette Taylor, '29, of the Department of Mechanical Engineering, are exploring the effects of size changes in single-cylinder engines; for the more firmly the design factors in single cylinders are established, the fewer will be the uncertainties in the design of multicylinder engines.

Up to the present time the basic effects of cylinder size have been appreciated only in a qualitative way by engine manufacturers, for no one has made a systematic quantitative study of this kind. This seems particularly surprising when it is remembered that nine-tenths of the nation's mechanical horsepower capacity is in internal-combustion piston engines. In determining such questions as what size cylinder to use or how long the piston stroke should be, designers are accustomed to making reasonable guesses based on a large amount of experience with equally empirical designs used in the past. The phenomenal success of existing designs, as exemplified by the modern highly efficient airplane engine, is more a tribute to the engineering intuition of the designers than to advanced knowledge of the fundamentals of engine design. It is believed that design factors can be put on a much more rational basis when the laws of similitude, that is, the relationships between a series of carefully scaled engines of different size, are accurately known. In other fields, such as hydrodynamics and aerodynamics, the laws of similitude were established long

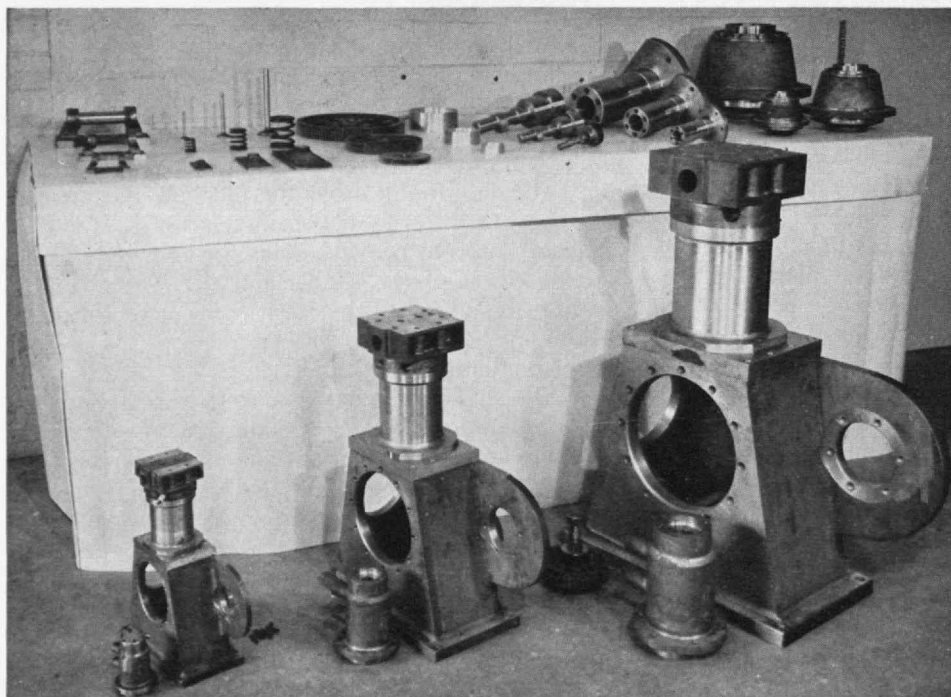


Volumetric efficiency plotted against mean piston speed for three geometrically similar single-cylinder engines.

ago and have been of tremendous value in permitting designers to predict the performance of any size ship or airplane from test results on small models. There is no reason why a knowledge of the laws of similitude in engines should not yield equally effective results.

To provide facilities for studying these laws, the design and fabrication of three geometrically similar single-cylinder engines with bores of two and one-half inches, four inches, and six inches diameter, respectively, were recently completed at the Sloan Laboratories and a test program is now under way. These engines are shown below, before trial assembly and mounting for test.

Theoretical analysis has already suggested the way many of the factors, such as air flow and stresses, should correlate, and experimental verification of these relations has already been obtained. For example, the graph shows that these engines have the same curve of volumetric efficiency (air intake volume divided by piston displacement) when the basis of plotting is the mean piston speed. This result was pre-



A group of single-cylinder engines, similar in every respect except in size, have been built in the Sloan Automotive Laboratory. Studies of the operation of these engines will enable designers to predict accurately the way in which performance depends upon size, since these are to be used in quantitative studies of the law of similitude as applied to the behavior of internal combustion engines.

The engines are shown before assembly and mounting on test stands. From left to right respectively, the bores are two and one-half, four, and six inches.

dicted from theory, but had never before been demonstrated experimentally.

Other factors, such as friction, lubrication, and heat losses have been subjected, in part, to theoretical analysis, but cannot yet be handled completely in this manner and require experimental data to complete the picture. Still other factors, such as "detonation," await experimental results before a quantitative correlation can even be proposed.

The program promises to enable designers to predict with precision the changes in performance of an engine as its size is changed. It will provide a quantitative basis for choosing optimum design parameters for greatest fuel economy, lightest weight, or minimum size. With the urge toward improved performance in all types of self-propelled vehicles, the importance of placing these basic concepts on a strong fundamental basis becomes increasingly urgent.

## Iron Absorbed from Food

RADIOACTIVE tracer techniques are being used in nutritional studies of iron assimilation conducted by the Department of Food Technology, in collaboration with the Departments of Biology and Physics. The studies were undertaken to learn quantitatively how the assimilation of iron is affected by the foods with which it is consumed. It has been shown that oatmeal is no more detrimental to iron assimilation than are equal amounts of other foods, even though phytates, salts of a phosphorus-containing organic acid present in most cereals, markedly impede iron absorption when added separately to a meal.

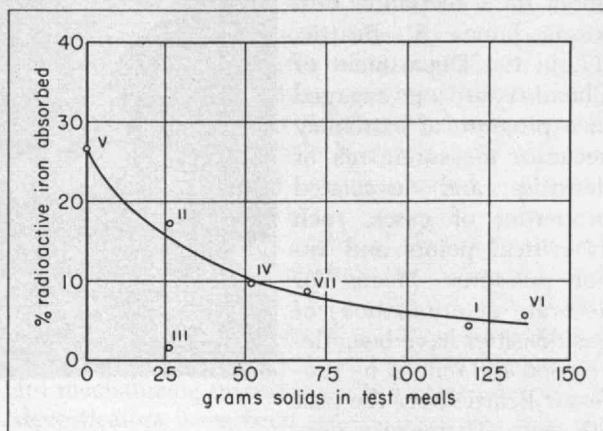
With the permission of their parents, 17 adolescent boys participated in the experiments on nutrition under the direction of Professor Robert S. Harris, '28, of the Department of Food Technology. The boys ate a breakfast which contained eight milligrams of iron. A small fraction of this iron — too minute to be harmful — was a radioactive isotope produced in a cyclotron and added in the form of ferric citrate or ferric chloride. The radioactive "tagged" atoms could easily be traced in their course through the body and were used to determine the amount of iron from the breakfast which appeared in the blood stream.

At intervals of several days after the breakfast, blood samples were taken and analyzed to determine how much radioactive iron was in the blood. When the iron absorbed had reached a steady quantity, another breakfast containing radioactive iron was eaten. Altogether, seven breakfasts were consumed having the quantities of food given in the table.

Test Meal	Composition of the Test Meals (in grams)						
	I	II	III	IV	V	VI	VII
Milk	200	200	200	200		200	200
Water					200		
Cooked rolled oats	285			173		285	285
White bread	34					56	
Egg omelet	75					75	
Tomato juice	150					150	
Sodium phytate			0.2				
Total wet weight	744	200	200.2	373	200	766	485
Total dry weight (calculated)	119	26	26	52	0	136	69

Generally 10 days were required before all of the

iron absorbed from a single meal reached an equilibrium quantity in the blood stream. Once in the body, no loss of radioactive iron was measured during a period of 175 days after a breakfast, at which time measurements were stopped. This is particularly remarkable since other tests have shown that the red corpuscles, containing most of the iron, are destroyed and remade on the average of once every 23 days. These results confirm those obtained concurrently and independently at another laboratory and may mean that the required daily intake of iron is much less than that previously thought necessary.



Of the amount of iron consumed with food, the fraction absorbed in the blood stream decreases with increasing size of meal.

The graph shows the fraction of the radioactive iron absorbed, plotted against the dry weight of the meal. It is evident that oatmeal had no greater effect on iron absorption than the other solid foods, whereas the sodium phytate very greatly decreased iron absorption. Since oatmeal contains phytates, it is evident that the phytates are not available to react with the iron during digestion.

Solid foods are shown to have a detrimental effect on iron absorption. Only one fifth as much iron was absorbed when taken with a full meal as when taken alone with a glass of water, suggesting that medicinal iron would be much more effective when taken between meals rather than at mealtimes.

The manner in which phytates affect calcium assimilation are now being investigated with the use of a radioactive isotope.

## Perfecting the Gas Laws

OVER wide ranges of pressure and temperature, the densities of most gases approximate those predicted by the perfect gas law, for which theory assumes no intermolecular forces. At low temperatures or high pressures, however, the forces between molecules are of sufficient magnitude to cause large deviations in the behavior of a gas from that which is predicted by the perfect gas law. Various equations of state — mostly determined empirically, although guided by theory, of course — have been proposed which allow for the intermolecular forces. By correlating such equations of state with measurements of pressure, temperature, and volume for gases, the theory by which the equations have been derived can



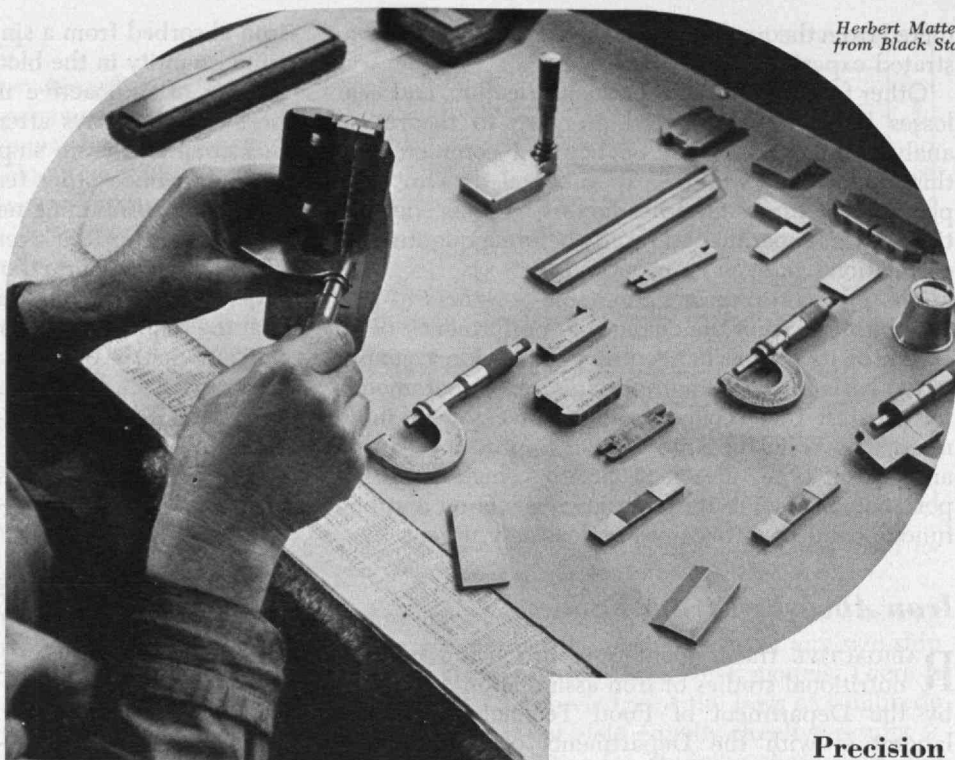
be tested and the magnitude of the intermolecular forces can also be evaluated. Ultimately it should be possible to establish gas laws which are valid for all conditions of pressure, temperature, and volume, either for pure (single compound) gases or for mixtures.

With this ultimate goal in mind, research workers, under the direction of Professor James A. Beattie, '17, in the Department of Chemistry are now engaged in a program of extremely accurate measurements of densities and associated properties of gases, such as critical points and vapor pressures. Means for accurate determinations of gas densities have been developed and refined by Professor Beattie over the past 20 years. To make a density measurement, a known mass of substance is transferred to a steel bomb whose temperature is controlled to within 0.001 degree C. of the desired temperature. The density of the substance is varied by forcing a known amount of mercury into the bomb, and the pressure is measured by dead weight pressure gauges. By this means the error in measurement of gas density has been reduced to less than one-tenth of one per cent, producing results of value for testing certain postulates of the kinetic theory of gases and theories of state.

High precision determinations of gas densities, critical points, and vapor pressures, provide basic information required both by the practical engineer in his design calculations for distillation and high-pressure processes, and by the theoretician in his effort to understand the forces between molecules. Precise measurements of gas density have direct industrial application in high-pressure processes, such as the synthesis of ammonia where the perfect gas law is greatly in error. In addition to indicating the size of equipment needed for a quantity of gas, such measurements are used to derive the thermodynamic properties of gases, for the prediction of chemical equilibrium, and of the heat and work effects involved in various processes. In calculations of distillation processes, this type of data is also required.

In a long-term research program now in progress, pressure, volume, and temperature relations and vapor-pressure data have been determined for such pure gases as ethane, propane, 1-butane, *n*-butane, isobutane, *n*-pentane, neopentane, *n*-heptane, ethyl ether, xenon, and krypton. The research is now being extended to the study of the density of gas mixtures.

Already mixtures of *n*-butane with methane, exemplifying a mixture of similar molecules (both non-polar) have been studied. Measurements are now be-



Herbert Matter  
from Black Star

## Precision

ing started on mixtures of methane and chloromethane, as examples of two gases of different types of molecules (nonpolar and polar). These measurements can be used to test various procedures for combining the constants of the equations of state for the pure components in order to obtain comparable data for gas mixtures. The determination of density for mixtures is such a formidable task that an accurate method of prediction from data on the pure gases is of extreme practical importance.

At the present time, one of the most satisfactory equations of state for simple gases expresses relations between temperature, pressure, number of mols of gas present, and other gas constants, more or less empirically in a series of four terms. The inclusion of a term containing the fourth power of volume is justified only by the availability of data sufficiently accurate for the purpose.

When more than one gas is present in a given volume, the properties of the mixture become even more difficult to predict since the intermolecular forces now act not only between the same but different species of molecules. In some cases, a gas may "dissolve" in another gas much as salt dissolves in water without greatly changing the resulting pressure. This is true for the case of water vapor in air. If air is forced into a container of water in equilibrium with its pure vapor, more water will evaporate, partly because of the slight increase in vapor pressure caused by the increase in total pressure of the system, but partly because water vapor will dissolve in the air. At high pressures, this latter effect can be very large.

It may be a long time before the work now in progress is brought to the desirable degree of completion. In the meantime, industrial practice and theory alike will make some progress with every step which is made in perfecting the gas laws.



## Renascent Antiquity

THE information clerk in a modern department store can readily direct inquirers to articles made of cotton, linen, silk, wool or other animal hairs, rayon, or nylon, and perhaps glass or metallic textiles; but in even the largest and best stocked of stores, a request for anything woven of *ramie* will probably be met by puzzled bafflement. Yet ramie is a fiber, with certain uniquely valuable characteristics, that has been known to man since the time of pre-dynastic Egypt. Why then has this textile remained so obscure? First, because originally ramie fiber could be freed from the plant in which it grows only by tedious hand labor. Secondly, because ramie suffers from what is called, in the jargon of the textile industry, "low spinning quality." Recently, however, much technological progress has been made in overcoming both of these difficulties.

Ramie comes from a shrub, *Boehmeria nivea*, that is related to the nettles although it has no stinging hairs. These plants are hardy perennials that live as long as 30 years, and produce as many as four crops each season. The ramie shrub grows readily in the warm temperate zone throughout the world. It is easily propagated by dividing roots and replanting. Weeding is unnecessary. Yield per acre is high — up to 10 times that for cotton.

In composition, ramie is allied to flax, hemp, and cotton in that it consists of cellulose and pectic bodies. Ramie resembles flax, hemp, and jute because the useful fibers are bast tissues of the plant that lie between the woody section and the outer bark or cortex. But ramie fibers are particularly difficult to detach from the bark (decorticate), and this operation must be

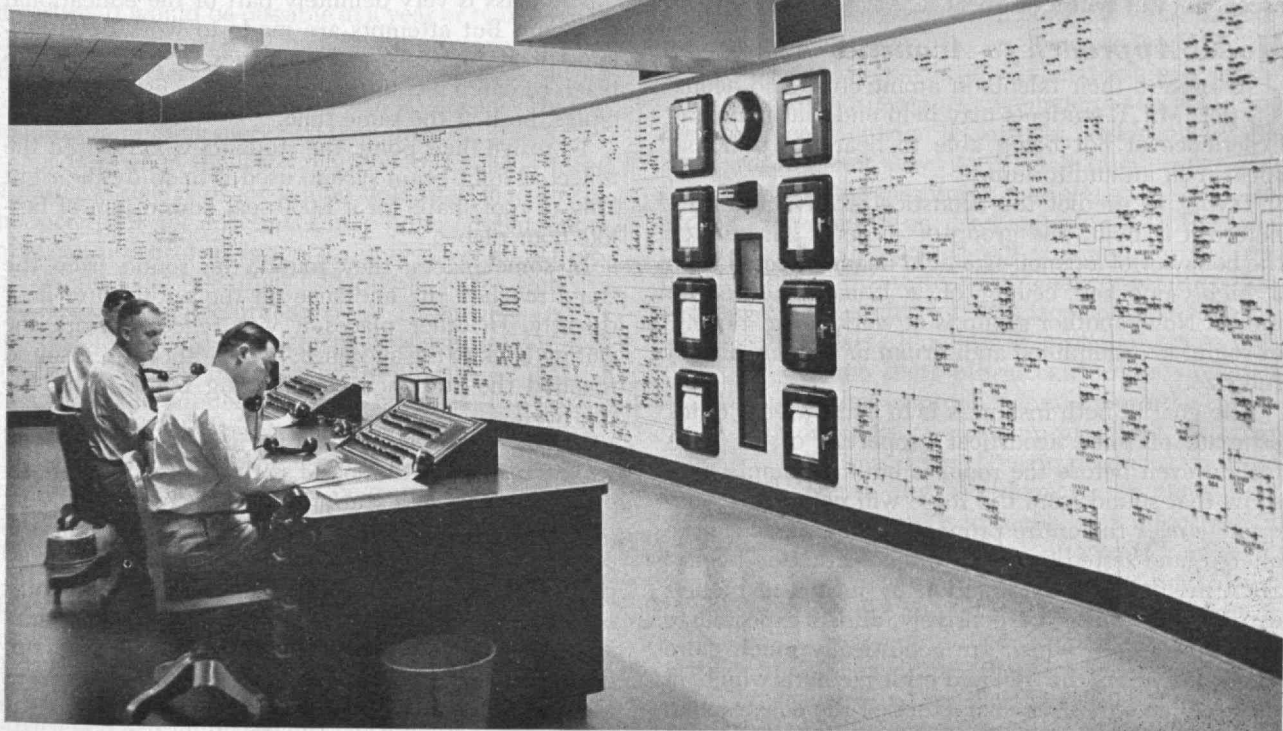
done within a short period after harvesting, before drying occurs. Until recently the only known means of decorticating ramie was tedious pounding by hand, and hand stripping of the fibers. Therefore, production was confined to countries like China where hand labor is cheap. In this primitive processing, removal of the tenacious resinous gum that surrounds ramie fiber was accomplished by prolonged soaking in water.

One of the potential values of ramie stems from the fact that it is by far the longest of the vegetable fibers, having an ultimate fiber length averaging 120 millimeters (as compared to only 28 millimeters for cotton or flax). But offsetting this virtue is the extraordinary variability of ramie. Thus these fibers have a range of 140 millimeters from shortest to longest, whereas cotton has a corresponding variability of only 30 millimeters; flax, 50 millimeters. In consequence, ramie until recently could be made only into coarse and hairy textiles, and used in limited applications, such as canvases or fire hose.

But ramie is lustrous, soft, and elastic, dyes readily, and has low shrinkage and high resistance to abrasion and mildew. Therefore, in recent decades, research aimed toward improvement of ramie processing has never flagged. One recent advance has been successful mechanizing of ramie decortication. Beyond this, decorticators have been designed on the "combine" principle, so that they operate right in the fields — harvesting and decorticating in one continuous op-

## Control

Post-Dispatch Pictures from Black Star.



eration. One of these decorticators, operated by eight men, is reported to produce a ton or more of fiber every two hours. This output is in striking contrast to that of the old hand methods, whereby the same number of men working a full day could produce only a few hundred pounds.

It has also been discovered that treatment with hot caustic solutions under high pressure will degum ramie without affecting the fibers. Neutralization, washing, and drying then prepare the ramie for spinning. Improvement of the spinning of ramie has grown from realization that neither conventional cotton-spinning machinery, nor standard wool-spinning equipment, are satisfactory for such use. As a result a novel spinning principle has been developed, that nevertheless may be applied by remodeling existing cotton-spinning mills. This advance has made possible production of Number 80 count ramie thread — several times finer than could formerly be spun. Such fine thread puts ramie in a position to invade the clothing, bed and table linen, and related fields, as well as to become a useful component of mixed textiles.

In anticipation of increasing use of ramie, extensive acreages of the shrub have been planted in the United States, principally in California, Texas, and Florida. The alluvial muck lands of the latter state have proved to be especially favorable for ramie cultivation. This new crop has been fostered by Federal and state departments of agriculture.

At the moment, ramie is still a minor element in the total fiber supply of the United States. Recent announcement of foreclosure sale of an important ramie mill in Florida indicates that the promoters of this textile have not left their days of adversity entirely behind. Nevertheless, ramie, a natural fiber of ancient lineage, shows greater promise of coming into widespread use today than it ever has before in its long and checkered history. How striking it is that this renaissance has occurred in the face of the current ascendancy of synthetic fibers.

### ***Model Approach to Acoustics***

**C**OMBINING their talents in architecture and acoustics, M.I.T. students may help end that annoying experience of not being able to hear the principal speaker in an auditorium.

Trying to predict the acoustics of an auditorium before it is built, one group of students has studied the behavior of a pencil-size light beam reflected from a highly-polished ceiling of a 12-inch auditorium model. Now, another group is at work using "beams" of sound in a simplified auditorium model one-fifth of full size.

The goal in both instances is to make a very quick estimate of some acoustical properties of an auditorium even before the room is built. If simple tests show that sound from the stage will not spread adequately over the entire proposed room, plans can be altered, and tested again, before construction begins. Such preliminary investigation by means of models can be done quite inexpensively, and is expected to result in designs which are acoustically much more satisfactory than the trial and error methods which, in the past have so often characterized the construction of music halls.

The method involving the light beam is based on the fact that (within certain limits) sound waves reflect from a wall in much the same way that light rays reflect from a mirror. Thus, a beam of light is made to take the part of sound waves in the optical analogue of an acoustic system. Light beams, reflected from mirrored panels in the model, show the paths which sound waves would take in the full-size auditorium. The paths of light beams are recorded on photographic paper to produce a permanent record for analysis or comparison with other arrangements.

Such an optical analysis saves the tricky graphical manipulations which are needed to study sound distribution from blueprints by more conventional methods. It gives better precision and could be developed into a rapid tool for aiding directly the development of new auditorium designs by permitting quick, comparative exploration of a succession of auditorium shapes with relatively simple models.

Another method of analyzing the acoustic properties of auditoriums through the models, but employing acoustic rather than optical analysis, is now under investigation. Making full use of the law of similitude, the "sound analysis" system is based on the fact that a high-pitched sound will behave in a small model just as a normally-pitched sound will behave in the full-size prototype. In this case the model — although larger than that required for optical analysis — can be very simple, and thus inexpensive, while still giving all needed information.

These two systems are both recent projects of students in an M.I.T. graduate course in architectural acoustics. Under the supervision of Richard H. Bolt, Associate Professor of Physics and Director of the M.I.T. Acoustics Laboratory, and Professor Lawrence B. Anderson, '30, Head of the School of Architecture, the class is guided by Robert B. Newman, '49, an M.I.T. graduate just beginning service on the architectural teaching Staff.

The class is very definitely part of the educational program. But attempts are made to work out problems in architecture and acoustics in new ways, to teach research techniques as well as to establish principles, both at the same time.

To prove their point, the students who devised the reflected light-beam system used it to study the right kind of roof shape for a 1,000-seat auditorium of fan-like floor plan.

In some places, they found, the sound from the stage reached the audience on the auditorium floor directly. In other places it was reflected from the ceiling back to the audience; in still other cases, sound reached the audience after having bounced off the rear wall.

In any well-designed auditorium, the ceiling and walls must reflect the sound so that it is spread evenly over the entire area seating the audience. In addition, the reverberation time — the time required for the sound to reach one millionth of its initial intensity — of the reflections from ceiling, walls, and floor, must have the proper value for auditoriums of different size. The methods of analysis used by Institute students provide a highly convenient and useful means of quickly arriving at much significant data in the proper acoustic design of auditoriums.



# The Essence of Security

*A People Voting Themselves into Eden from a Supposedly*

*Inexhaustible Purse Are No Match for a Dictatorship*

By VANNEVAR BUSH

**Y**ou men to whom I speak, as students at M.I.T., are nearly all scientists and engineers, or at least you expect to be. In these capacities, your function will be to understand the physical world, and on that basis to build, to raise standards of living, to further prosperity, and thus to assure the general condition of decency by which cordiality and understanding among nations may be fostered. Engineers and scientists, as you hope to be, are skilled in objective reasoning. In particular, they usually can add two and two, and get four. As an exercise in addition, I would place before you a few important items of recent news. They are digits in a sum, or factors in an equation. As is too often true of these things, they may not at first glance appear to be related.

First, President Truman recently expressed the conviction that the total income of this country, now over 200 billion dollars a year, should be raised to 300 billion dollars a year. National output normally increases 2 per cent a year because of technical advance; it is now probably increasing 3 per cent a year because of greater reliance on research since World War II. In less than a generation this factor alone can bring about the increase called for. But the President had in mind no such interval; he calls on us to move much faster toward a highly desirable end. While he spoke in terms of dollars, he undoubtedly thought in terms of product and services, of which dollars are merely a measure. It would be possible in a year or two to reach the 300 billion mark by merely voting wide Federal benefits and increased taxes, thus reaching an output at once of 300 billion dollars worth \$0.40 each. He had in mind something more real than this.

Second, when the last Congress adjourned it faced a national deficit of six billion dollars. It had in the hopper ready for enactment nine billion dollars more of expenditure for divers good causes. One bill in process would have furnished Federal aid to the states in the form of architectural services. There were dozens more. The Federal government now supports or subsidizes in one way or another more than a quarter of the population, if one includes those indirectly dependent on the subsidy. The nine billion would have increased this fraction significantly. Congress adjourned temporarily and will be back in a month.

The next item comes from overseas. England is short of fats. Africa has enormous areas of fertile uncultivated land. The labor government recently spent £20,000,000 to start raising peanuts in Africa and extracting the oil. The govern-

mental agency built docks, roads, schools, hospitals, housing, and acted throughout for the benefit of the employed. It didn't raise any peanuts to speak of. It is approaching the end of its funds, and admits it will not raise many peanuts. The House of Commons declines to investigate.

The last item is fresh in your minds. President Truman recently announced that there was an atomic explosion in the heart of the Eurasian continent.

Now are these items connected, and do they mean anything to you personally? Moreover can you do anything about it?

There is a connection among the items I have mentioned. They mean much to you, and to all of us. You can do something about it, and if you are as clear-headed as I think you are, you realize not simply that you can, but that you must. Each of them bears directly on the fundamental question of our times — the strength of the free democratic system as compared with the strength of the totalitarian system, and the ability of each system to grow in strength in the years to come. Until such time as reason and good will prevail, and a rational answer to the problem of live and let live in a complex world is established, this comparative estimate will stand as the most important imponderable in the world's vocabulary. By and large, all questions of policy, national or international, economic or political, immediate or long-range, take on importance and urgency to the degree — and only to the degree — that they bear on this basic issue.

Russia is a closely controlled dictatorship, a police state, with full ultimate management of the details of the life of every citizen. It can hold, and has held, the standard of living down to a small fraction of ours, denying its people the simple comforts of existence, in order to focus effort on guns and atoms. In the long run a totalitarian state cannot compete with a free people in the advancement of science, for dictation and dogma are contrary to the free spirit of inquiry, which is the heart's blood of scientific advance. But,

in the short run, it can produce what it wishes to produce, and ignore the sufferings of its people, up to a limit, and that limit is high. It can produce an atom bomb, and has done so. In time, how much time is arguable and important, it can produce a stock of atomic bombs.

The atomic bomb does not stand alone. It is not an absolute weapon. It is part of a vast and intricate armament, and much of the nature of that armament was spread out for all the world to see in World War II, and is known to many technicians in

*The text of Dr. Bush's challenging address to the student body of the Massachusetts Institute of Technology, in convocation on December 5, is presented with but minor editorial emendation. — Ed.*





Russia as elsewhere. Russia can build fleets of bombers, jet aircraft for defense, radar networks, as well as guided missiles.

But can it build all these at once, in ample quantities, in reliable form, operated by well-trained men of initiative and resourcefulness? The answer to this question depends upon what one believes the Russian economic system can stand without collapse. But, whatever the estimate, there is no doubt that Russia can build, and is building, a formidable military machine. Whether it does so from genuine fear of attack, or in a dream of conquest, is beside the question; we face the fact that, barring an improbable early internal collapse, such armament will appear in the hands of an absolute closely knit central governing group of men who distrust us and would destroy us if opportunity offered.

We can meet that threat if we are strong. We can in fact meet it without war, for those in the Kremlin recognize strength if they recognize nothing else. The fact that we can meet it was recently proved when this country, bringing to bear on grim business the resourcefulness and initiative nurtured in freedom, armed its allies and joined with them to strike down the Nazi might.

But we cannot meet it if we turn this country into a wishy-washy imitation of totalitarianism, where every man's hand is out for pabulum, and virile creativeness has given place to the patronizing favor of swollen bureaucracy. Dictatorships can compete with dictatorships, and free virile democracy can outpace any such in the long pull. But a people bent on a soft security, surrendering their birthright of individual self-reliance for favors, voting themselves into Eden from a supposedly inexhaustible public purse, supporting everyone by soaking a fast disappearing rich, scrambling for subsidy, learning the arts of political logrolling and forgetting the rugged virtues of the pioneer, will not measure up to competition with a tough dictatorship. If we go all the way down the path to dependence and render ourselves a people fawning for handouts on an intriguing bureaucracy, Russia can cease its building of war machines. It will conquer the world without them.

Now I am no pessimist. I believe in the democratic system, and I believe in the sound common sense of the American people. Moreover, I believe thoroughly that we have the wit to recognize a dangerous trend, reverse it before it is too late, and laugh at sirens with crack-brained economic theories who would

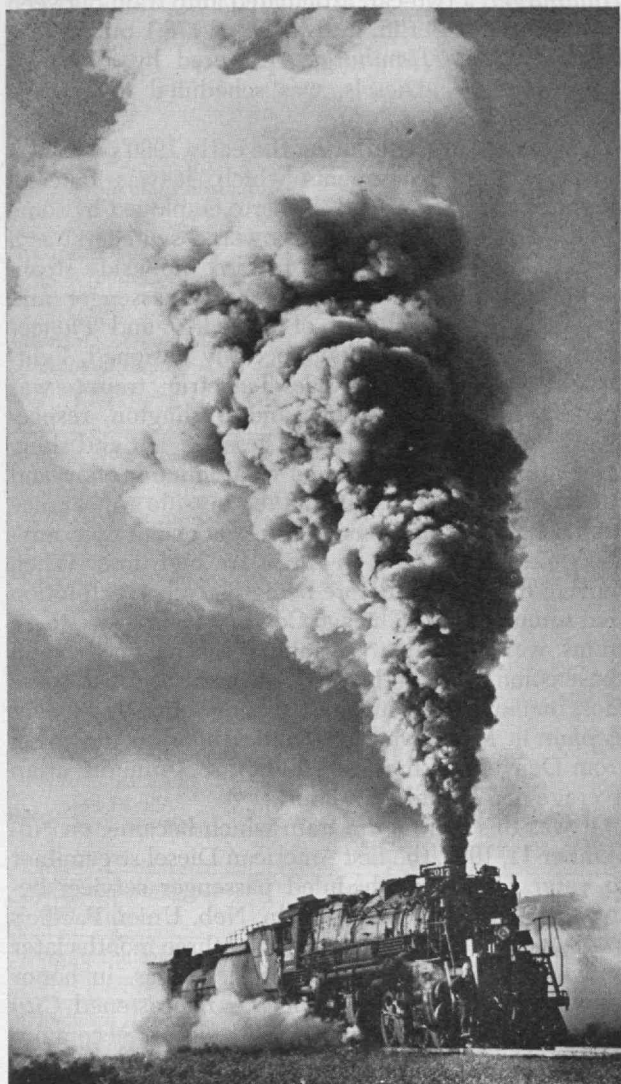
guide us down an easy path over a precipice. I believe also that the past generation, with a rise in the power of the common voter, and an increase also in his perception and grasp of public affairs, has brought with it highly salutary progress toward protection of the small man against the hazards of nature or of his grasping neighbor. We live in a better world because of awakened public consciousness of its power and its possibilities. We have done much for the underprivileged and more for the laborer at the bench, and it is well. But we can outpace ourselves, attempt too much, and wreck the industry on which all material progress depends. Still I believe the American people are too tough minded to pursue a will-o'-the-wisp over a cliff. I know they can add, and I do not believe they are fooled by stories of magic wands or of inexhaustible treasures. If I am wrong, we are in for disaster.

But my main point today is to ask what you men propose to do about it. Some of you will differ with my point of view quite completely, but no matter. I ask what you propose to do about your own theory of the dilemma and its solution. Unless you take the naïve point of view that the building of a powerful military machine overseas is no concern of ours (and that delightful fiction seems to have disappeared even from the ranks of the isolationists) there is something to be done. Unless you take the equally naïve point of view that this is an affair for our own military men and no concern of the private citizen, you have a problem squarely on your doorstep. Moreover it is peculiarly yours—for the strength of this country means more than arms and services, it involves the entire strength and prosperity of the country, which is a matter directly in your area. The question is whether you will be content to build in a technical sense, and let someone else worry about the larger problems.

Some of you, unhappily, will spend your time and effort exclusively in passing technical courses, and thoroughly shun those dealing with man's relation to man. You will pay not the slightest attention to the political maelstrom about you, and look down on those who take an interest in politics, or who have the hardihood actually to practice it. You will regard such things as history, economics, mass psychology, foreign relations, as soft generalizations, not worthy of the steel of the man who can manipulate a Fourier integral. Or at the other extreme some will browse in generalities and amuse yourselves with vague nonrigorous speculations and know nothing of a Fourier in-

*(Concluded on page 168)*





Fred Matthews, Jr.: Trains Magazine

**E**VEN as opinions ventured about tomorrow's weather, claims about how fast one can go from here to there, on trains publicized as being ultraspeedy, have provoked and sustained many a contentious discussion ever since railroading began. Each topic offers a natural conversational gambit affluent in potential pros and cons, the amplitudes of which are perennially enlarged through the observance of newer data.

For instance, back in 1933 the aggregate train mileages, booked to operate from start to stop in the United States, France, Great Britain, and Germany at 60 miles an hour and over, totaled 10,571. More than half, 5,462 miles to be exact, was accounted for by runs on French railways, and only a fifth, slightly over 2,000 miles, by those in the United States. In the next five years, the 10,571 figure increased eightfold, to a total mileage of 84,659 for the four countries, and the world mileage run in excess of a mile-a-minute average stood at 93,312. Of the 1938 world's total, more than half, 48,164 miles, was booked on American rails. France stood second with 14,594 miles, Great Britain third with 11,665, and Germany fourth with 10,236 miles.

Corresponding statistics of 1943, the end of the ensuing five-year period, are unavailable except for the

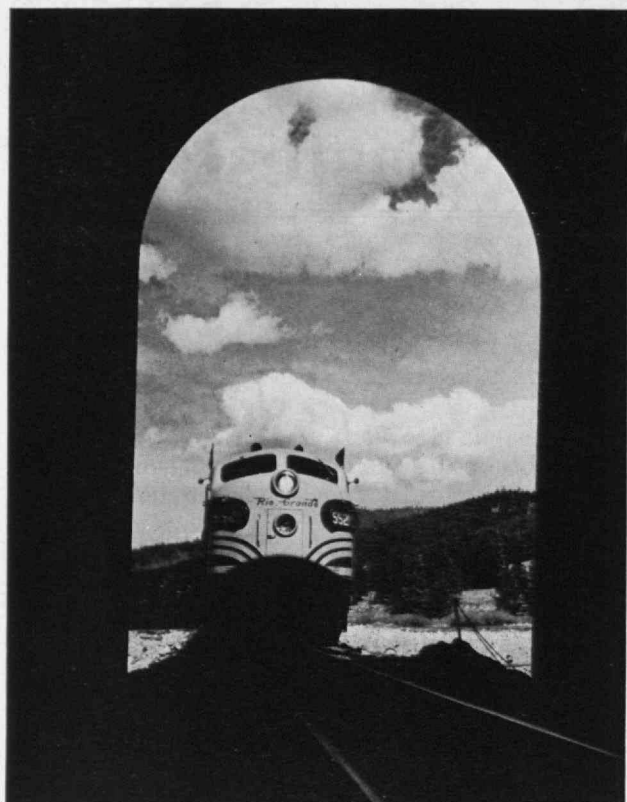
# The Fastest Trains

*A Survey of the Increases in Speed  
over High Iron during the 1940's*

By H. E. LOBDELL

United States; and by 1948, postwar railway recovery in Europe had not progressed sufficiently to permit then current British or French figures being treated as significantly comparable with those for the United States. In the table "Ten-Year Advance . . ." it will be noted, however, that the aggregate American mileages scheduled for at least 60 miles an hour advanced from 48,164 in 1938 to 92,118 by 1943 (an increase of 91 per cent), and to 129,172 by 1948 (an increase for the decade of 168 per cent).

Data in the table also definitely show Diesels were the leading form of 1938-1948 railroad motive power for mileages scheduled at 70 miles an hour and over; and how Diesels overtook steam for the 60-70 miles an hour range by the close of 1943. But steam's amazing displacement on American rails between 1943 and 1948 — 6,888, or 17 per cent, fewer steam locomotives in the 1948 inventories, which included 3,730, or 141 per cent, more Diesel and electric locomotives — has not come about wholly by the predominance of the Diesel in high-speed operations. Today, Diesels are common on many slowpoke secondary lines, such as on the Washington County branch of the Maine Central at the head ends of locals meandering down East from Bangor to Calais. For, among its other advantages under actual operating conditions, a single horse-



Ralph E. Hallock: Trains Magazine

power of a Diesel can perform the tasks hitherto expected of approximately two and four tenths of a steam locomotive — because the Diesel, unlike the iron horse, does not have to be withdrawn from the road periodically to be “fed, watered, and rested.”

In 1932, there was only one train in the world with a timetable calling for it to maintain a nonstop run between two stations at an average of at least 70 miles an hour. This was the Great Western’s *Cheltenham Flyer*, which in that year was speeded up to cover the 77.3 miles from Swindon to Paddington Station, London, at a rate of 71.4 miles an hour instead of its previous average of 66.3. Less than a year later, however, the *Deutsches Reichsbahn* put in service *Fliegende*

*Hamburger*, a two-car, articulated auto train between Hamburg and Berlin, a distance of 178.1 miles. This original *Flying Hamburger*, powered by a pair of 410-horsepower Diesels, was scheduled to average 75.8 miles an hour.

Cisatlantic interest during the early 1930’s was also focused upon experiments which, it was fancied, might develop the Diesel (hitherto employed by some American railways for light-powered switchers) as a form of motive power able to rank alongside steam and electric locomotives in general passenger and freight service. Delivery of *M-10,000* and *Pioneer Zephyr*, two experimental, specially designed, lightweight, high-powered Diesel-electric trains, was made to the Union Pacific and Burlington, respectively, in the spring of 1934. These elegant and shiny streamliners, the first named of aluminum alloy and the other of stainless steel, in their outside appearance and interior appointments were indeed unlike anything previously seen on American high iron. When touring the country before being placed on exhibition that summer at the Chicago Century of Progress, these trains were tested at sustained speeds far beyond those commonly run by ordinary trains; probably the most memorable of such trials being a run by *Pioneer Zephyr* in May, over 1,000 miles nonstop, downhill from Denver to Chicago in 13 hours, 5 minutes, at an average of 77.6 miles an hour.

It was this Burlington train which became, on November 11, 1934, the first American Diesel streamliner to enter regularly scheduled passenger service, between Kansas City and Lincoln, Neb. Union Pacific’s *M-10,000* was the second, less than three months later between Kansas City and Salina, Kansas, in honor of which western terminal it was rechristened *City of Salina*. The first streamliner with sleeper accommodations, a seven-car Diesel train, began its original schedule of five round trips a month between Chicago and Portland, Ore., on June 6, 1935, under the name of *City of Portland*.

Although in day-to-day operation none of these three trains at the start promised patrons a ride between stops at more than 60 miles an hour, their actual

# TEN-YEAR ADVANCE (1938–1948) IN AGGREGATE TRAIN MILEAGES BOOKED TO OPERATE DAILY IN THE UNITED STATES FROM START TO STOP AT 60, 70, AND 75 MILES AN HOUR AND OVER

(Based upon data for 1938 and 1943 compiled by *Railway Gazette*, London, and for 1948 by *Railroad Magazine*, Chicago)

Daily Runs At and Over		Five-Year Changes						Ten-Year Changes	
		1938	1943	1948	1938–1943	1943–1948		1938–1948	
60 m.p.hr.	Diesel	14,840	36,553	91,434	up 21,713 (146%)	up 54,881 (150%)	up	76,594 (516%)	
	Steam	23,692	38,570	18,966	up 14,878 (63%)	down 19,604 (51%)	down	4,726 (20%)	
	Electric	9,632	16,995	18,772	up 7,363 (77%)	up 1,777 (10%)	up	9,140 (95%)	
	Totals	48,164	92,118	129,172	up 43,954 (91%)	up 37,054 (40%)	up	81,008 (168%)	
70 m.p.hr.	Diesel	3,273	6,790	14,651	up 3,517 (108%)	up 7,861 (116%)	up	11,378 (348%)	
	Steam	960	1,993	59	up 1,033 (108%)	down 1,934 (97%)	down	901 (94%)	
	Electric	182	419	228	up 237 (130%)	down 191 (46%)	up	46 (25%)	
	Totals	4,415	9,202	14,938	up 4,787 (108%)	up 5,736 (62%)	up	10,523 (238%)	
75 m.p.hr.	Diesel	982	1,806	3,194	up 824 (84%)	up 1,388 (77%)	up	2,212 (225%)	
	Steam	—	212	—	up 212 —	down 212 (100%)	down	—	
	Electric	30	—	—	down 30 (100%)	—	down	30 (100%)	
	Totals	1,012	2,018	3,194	up 1,006 (99%)	up 1,176 (58%)	up	2,182 (216%)	



# TRAINS BOOKED TO OPERATE DAILY IN THE UNITED STATES FROM START TO STOP AT 75 MILES AN HOUR AND OVER IN OCTOBER 1949

(Compared with the fastest daily trains scheduled on these runs in 1939)

1949 Train and Railroad	Terminals of Run	Mileage of Run	1949	1939	1939 Train
			Minutes-Direc- tion-Miles an Hr. Averaged	Minutes-Direc- tion-Miles an Hr. Averaged	
New England States New York Central	La Porte-So. Bend	26.7	{ 19-E-84.3 21-W-76.3	29-E-55.2 28-W-57.2	No. 614 Iroquois
Morning Zephyr and Afternoon Zephyr Burlington	E. Dubuque-Prairie du Chien	54.6	39-N-84.0	44-N-74.4	Morning Zephyr and Afternoon Zephyr
	La Crosse-Prairie du Chien	57.7	{ 42-S-82.4 44-N-78.7	52-S-66.5 53-N-65.3	
	No. La Crosse-Winona Jct.	26.9	20-N-80.7	23-N-70.1	
	Aurora-Oregon	60.4	48-N-75.5°	52-N-69.7	
City of New Orleans Illinois Central	Kankakee-Rantoul	57.9	42-S-82.7		
Morning Hiawatha Milwaukee	Sparta-Portage	78.3	59-S-79.6		
Panama Ltd. Illinois Central	Kankakee-Champaign	72.0	55-S-78.5	85-S-50.8	Panama Ltd.
City of Milwaukee Commuter "400"	{ Northwestern Kenosha-Waukegan	15.7	12-S-78.5	16-S-58.9	{ The Valley No. 206 No. 214
Cities of San Francisco, Los Angeles, and Portland Union Pacific	Grand Island-No. Platte	137.2	{ SF:105-W-78.4 LA:105-W-78.4 P:107-W-76.9	114-W-72.2 114-W-72.2 115-W-71.6	Cities of San Francisco, Los Angeles, and Portland
	Cheyenne-Sidney	102.0	{ SF:79-E-77.5 P:79-E-77.5	86-E-71.2 86-E-71.2	
Afternoon Hiawatha Milwaukee	New Lisbon-Portage	43.1	33-S-78.4	35-S-73.9	The Hiawatha
Empire Builder Burlington	E. Dubuque-La Crosse	112.3	86-N-78.3		
Olympian Hiawatha Milwaukee	La Crosse-Portage	102.9	{ 80-S-77.1 81-N-76.2	115-S-53.7	Pioneer Ltd.
Denver Zephyr Burlington	Galesburg-Aurora	124.5	97-E-77.0	97-E-77.0	{ Denver Zephyr
	Chicago-Galesburg	162.0	127-W-76.5	130-W-74.7	
Twin Cities "400" Northwestern	Evanston-Racine	49.9	39-N-76.8		
Zephyr 9902 Burlington	Galesburg-Galva	23.0	18-E-76.6	26-E-53.1	{ Ak-Sar-Ben Am. Royal
Interstate Express New York Central	La Porte-So. Bend	26.7	21-E-76.3	29-E-55.2	No. 614
City of Denver Union Pacific	No. Platte-Kearney	95.0	75-E-76.0	71-E-80.3	{ City of Denver
	Julesburg-No. Platte	81.2	65-E-75.0	63-E-77.3	
Green Diamond Illinois Central	Kankakee-Gibson City	54.1	43-S-75.5	46-S-70.6	The Daylight
California Zephyr Burlington	Aurora-Galesburg	124.5	99-W-75.4	96-W-77.8	Denver Zephyr

° Afternoon Zephyr only.

speeds were thought remarkable for a time when a limited train was still defined as one "bearing a distinctive name; operating at an over-all speed of 40 miles per hour or more for distances of over 200 miles." Moreover, they were the forerunners of a fleet of 21 Diesel streamliners which, within another five years, were to provide transportation for the American public on schedules calling for rates in excess of 70-75 miles per hour between stations, with one train actually carded to do better than 80 on two of its runs.

In retrospect, all early Diesels admittedly were cramped inside, compared with standard equipment, and the vibrations of the power plant — and its fumes — often were unpleasantly noticeable aft, even unto the observation it sometimes seemed. Yet the public liked these trains, not only for their speeds and the novelty of riding something new and different, but for what they portended as relaxing influences upon the thinking of railroad managements, long regarded as inexorably allergic against improvements advocated

# REPRESENTATIVE FAST RAILROAD RUNS BETWEEN METROPOLITAN CENTERS IN THE UNITED STATES AND CANADA

(Figures after names of trains indicate hours, mileage, and average speed, respectively. Example: the present schedule of Pennsylvania's Congressional between New York and Washington in 3.6 hours over a distance of 227 miles is at an average of 63.0 miles per hour.)

Number of Run and Terminals		Railroad	1950		1940		1930		1920		1910		Number of Run 1
1	New York-Washington	Pennsylvania	Congressional 3.6-227-63.0		Congressional 3.6-227-63.0		Congressional 4.5-229-50.9	Yankee Clipper 4.75-229-44.1	Merchants 5.2-229-44.1	Congressional 5.1-226-44.4	Congressional 5.0-226-45.2		1
2	Boston-New York	New Haven	Merchants <sup>1</sup> 4.0-229-57.3		Yankee Clipper 4.5-229-50.9		Green Diamond 5.2-294-56.5	Mich. Boulevard 6.5-294-45.3	Daylight Spec. 8.0-294-36.8	Alton Ltd. 7.75-284-36.7	Banner 8.0-284-35.5		2
3	Chicago-St. Louis	Illinois Central	Green Diamond 5.2-294-56.5		Abraham Lincoln 5.2-284-54.6		Blue Bird 5.4-286-52.9	Inter-City 6.5-334-51.3	Inter-City 6.0-334-55.6	North Coast 12.9-431-33.4	Olympian 12.4-410-33.1	North American 12.8-411-32.1	3
		Gulf, Mobile & Ohio <sup>2</sup>	Abraham Lincoln 5.2-284-54.6		Blue Bird 5.4-286-52.9		Inter-City 6.5-334-51.3	Inter-City 6.0-334-55.6	Inter-City 6.0-334-55.6	Olympian 12.4-410-33.1	North American 12.8-411-32.1	Victory 9.8-396-40.4	
		Wabash	Blue Bird 5.4-286-52.9		Inter-City 6.5-334-51.3		Inter-City 6.5-334-51.3	Inter-City 6.0-334-55.6	Inter-City 6.0-334-55.6	North Coast 12.9-431-33.4	Olympian 12.4-410-33.1	North American 12.8-411-32.1	4
4	Montreal-Toronto	Canadian National	Internationals 6.25-335-53.6		Internationals 6.25-335-53.6		Morning Zephyr 6.25-427-68.3	Morning Zephyr 6.25-431-68.9	Morning Zephyr 6.25-431-68.9	North Coast 12.9-431-33.4	Olympian 12.4-410-33.1	North American 12.8-411-32.1	5
5	Chicago-St. Paul	Burlington	Morning Zephyr 6.25-427-68.3		Aft. Hiawatha 6.25-410-65.6		Twin Cities "400" 6.25-396-63.4	Ohio State Ltd. 7.6-436-57.3	Broadway 7.9-439-55.6	Senator 8.25-458-55.6	Broadway 7.9-468-59.2	Morning Daylight 9.75-470-48.2	6
6	New York-Buffalo	New York Central	Ohio State Ltd. 7.6-436-57.3		Broadway 7.9-439-55.6		Senator 8.25-458-55.6	Broadway 7.9-468-59.2	Daylight 9.75-470-48.2	Southland 11.5-490-42.6	Royal Palm 12.6-491-38.9	Southerner 12.7-638-50.2	7
7	New York-Pittsburgh	Pennsylvania	Broadway 7.9-439-55.6		Senator 8.25-458-55.6		Broadway 7.9-468-59.2	Morning Daylight 9.75-470-48.2	Southland 11.5-490-42.6	Royal Palm 12.6-491-38.9	Southerner 12.7-638-50.2	Shasta Daylight 15.5-718-46.3	8
8	Boston-Washington	New Haven and Pennsylvania	Senator 8.25-458-55.6		Broadway 7.9-468-59.2		Morning Daylight 9.75-470-48.2	Southland 11.5-490-42.6	Royal Palm 12.6-491-38.9	Southerner 12.7-638-50.2	Shasta Daylight 15.5-718-46.3	Texas Eagle 14.0-711-50.8	9
9	Chicago-Pittsburgh	Pennsylvania	Broadway 7.9-468-59.2		Morning Daylight 9.75-470-48.2		Southland 11.5-490-42.6	Royal Palm 12.6-491-38.9	Southerner 12.7-638-50.2	Shasta Daylight 15.5-718-46.3	Texas Eagle 14.0-711-50.8	Texas Spec. 13.6-689-50.7	10
10	San Francisco-Los Angeles	Southern Pacific	Morning Daylight 9.75-470-48.2		Southland 11.5-490-42.6		Royal Palm 12.6-491-38.9	Southerner 12.7-638-50.2	Shasta Daylight 15.5-718-46.3	Texas Eagle 14.0-711-50.8	Texas Spec. 13.6-689-50.7	Liberty 16.0-837-52.3	11
11	Cincinnati-Atlanta	Louisville & Nashville	Southland 11.5-490-42.6		Royal Palm 12.6-491-38.9		Southerner 12.7-638-50.2	Shasta Daylight 15.5-718-46.3	Texas Eagle 14.0-711-50.8	Texas Spec. 13.6-689-50.7	Liberty 16.0-837-52.3	Capital 15.4-767-49.8	12
12	Washington-Atlanta	Southern	Southerner 12.7-638-50.2		Shasta Daylight 15.5-718-46.3		Texas Eagle 14.0-711-50.8	Texas Spec. 13.6-689-50.7	Liberty 16.0-837-52.3	Capital 15.4-767-49.8	International 17.5-851-48.6	International 17.75-849-47.8	13
13	Portland-San Francisco	Southern Pacific	Shasta Daylight 15.5-718-46.3		Texas Eagle 14.0-711-50.8		Texas Spec. 13.6-689-50.7	Liberty 16.0-837-52.3	Capital 15.4-767-49.8	International 17.5-851-48.6	International 17.75-849-47.8	International 18.25-848-46.5	14
14	St. Louis-Dallas	Missouri Pacific	Texas Eagle 14.0-711-50.8		Texas Spec. 13.6-689-50.7		Liberty 16.0-837-52.3	Capital 15.4-767-49.8	International 17.5-851-48.6	International 17.75-849-47.8	International 18.25-848-46.5	International 18.25-848-46.5	15
15	Washington-Chicago	Pennsylvania	Liberty 16.0-837-52.3		Capital 15.4-767-49.8		International 17.5-851-48.6	International 17.75-849-47.8	International 18.25-848-46.5	International 18.25-848-46.5	International 18.25-848-46.5	International 18.25-848-46.5	16
16	Montreal-Chicago	Canadian National	International 17.5-851-48.6		International 17.75-849-47.8		International 18.25-848-46.5	International 18.25-848-46.5	International 18.25-848-46.5	International 18.25-848-46.5	International 18.25-848-46.5	International 18.25-848-46.5	

17	Cincinnati-New Orleans	Louisville & Nashville	Humming Bird 19.1-922-48.2	Pan-American 22.1-922-41.7	Pan-American 23.75-921-38.8	New Orleans Ltd. 26.5-923-34.8	Number 1 26.5-923-34.8	17
18	Chicago-New Orleans	Illinois Central	City of New Orleans 15.9-921-57.9	Panama 20.0-921-46.0	Panama 21.0-921-43.8	Panama 22.75-921-40.5	New Orleans Spec. 25.25-921-36.5	18
19	New York-Chicago	New York Central	20th Century <sup>4</sup> 15.5-961-62.0	20th Century 16.0-961-60.0	20th Century 20.0-961-48.0	20th Century 20.0-979-48.9	20th Century 18.0-983-54.6	19
		Pennsylvania	Broadway 16.0-908-56.8	Broadway 16.0-908-56.8	Broadway 20.0-908-45.4	Broadway 20.0-909-45.4	Pennsylvania Spec. 18.0-909-50.2	
20	Boston-Chicago	B. & A. and New York Central	New England States 18.0-1019-56.6	New England States 19.0-1019-53.6	20th Century 22.25-1019-45.8	20th Century 22.25-1038-46.5	20th Century 20.5-1043-50.9	20
21	New York-Jacksonville	Atlantic Coast Line	Chomphon 17.9-1024-57.2	Chomphon 18.25-1021-56.0	Havana Spec. 22.5-1021-45.4	Florida Spec. 27.0-1021-37.8	N.Y. & Florida Spec. 24.8-1018-40.1	21
		Seaboard	Silver Meteor 18.4-983-53.4	Silver Meteor 18.6-983-52.8	Southern States Spec. 25.75-982-38.2	Seaboard Florida Ltd. 27.5-982-35.7	Seaboard Florida Ltd. 24.8-982-39.6	
22	Denver-Chicago	Union Pacific	City of Denver 16.1-1048-65.1	City of Denver 15.6-1048-67.2	Denver Spec. 24.75-1048-42.4	Denver Spec. 28.0-1052-37.6	Denver Spec. 27.0-1060-39.3	22
		Burlington	Denver Zephyr 16.1-1034-64.2	Denver Zephyr 15.6-1034-66.3	Denver Ltd. 24.75-1034-41.8	Denver Ltd. 28.5-1034-36.3	Chicago Ltd. 27.5-1034-37.6	
23	New York-St. Louis	New York Central	Knickerbocker 20.75-1157-55.8	Knickerbocker 21.3-1158-54.3	Southwestern 23.0-1156-50.2	Southwestern 26.6-1158-43.5	Southwestern 24.0-1175-49.0	23
		Pennsylvania	Spirit of St. Louis 19.9-1051-52.8	Spirit of St. Louis 20.0-1051-52.6	Spirit of St. Louis 23.0-1052-45.7	St. Louisian 24.8-1053-42.5	24-Hour St. Louis 24.0-1060-44.2	
24	Boston-St. Louis	B. & A. and New York Central	Southwestern 24.2-1215-50.2	Southwestern 24.3-1216-50.0	Southwestern 25.8-1215-47.1	Southwestern 29.1-1216-41.8	N.Y. Central Ltd. 26.1-1235-47.3	24
25	New Orleans-Los Angeles	Southern Pacific	Sunset 46.5-1996-42.9	Sunset 53.75-2007-37.3	Sunset 56.3-2008-35.6	Sunset 62.5-2003-32.5	Number 9 75.6-2003-26.9	25
26	Chicago-Los Angeles	Union Pacific	City of Los Angeles 39.75-2299-57.8	City of Los Angeles 39.75-2299-57.8	Los Angeles Ltd. 61.0-2299-37.7	Overland 72.2-2301-31.9	Los Angeles Ltd. 72.0-2310-32.1	26
		Santa Fe	Super Chief 39.75-2224-55.9	Super Chief 39.75-2227-56.0	Chief 56.0-2228-39.8	California Ltd. 71.5-2231-31.2	California Ltd. 72.0-2267-31.5	
		Rock Island	Golden State 45.0-2268-50.4	Golden State 58.8-2274-38.7	Golden State 61.0-2281-37.4	Golden State 73.5-2276-31.0	California Spec. 72.0-2275-31.6	
27	Chicago-San Francisco	Union Pacific	City of San Francisco 39.75-2263-56.9	City of San Francisco 39.6-2261-57.1	Overland 56.0-2261-40.9	Overland 72.0-2264-31.4	China & Japan Fast Mail 66.5-2278-34.3	27
28	Portland-Chicago	Union Pacific	City of Portland 40.0-2272-56.8	City of Portland 39.75-2272-57.2	Portland Rose 57.5-2272-39.5	Oregon-Wash. Ltd. 72.0-2266-31.5	Oregon-Wash. Ltd. 72.0-2291-31.9	28
		Great Northern	Empire Builder 44.5-2260-50.8	Empire Builder 57.2-2317-40.5	Empire Builder 57.25-2245-39.2	Oriental 72.0-2243-31.2	Oriental 72.0-2294-31.9	
		Northern Pacific	North Coast 56.75-2317-40.8	North Coast 57.25-2322-40.6	North Coast 57.5-2316-40.3	North Coast 72.0-2312-32.1	Northern Pacific Exp. 72.0-2319-32.4	
29	Seattle-Chicago	Great Northern	Empire Builder 45.0-2211-49.1	Empire Builder 56.4-2268-40.2	Empire Builder 57.25-2196-38.4	Oriental 72.0-2206-30.6	Oriental 72.0-2256-31.3	29
		Milwaukee	Olympian Hiawatha 45.0-2189-48.6	Olympian 56.6-2188-38.6	Olympian 58.0-2188-37.7	Olympian 72.0-2190-30.4		
		Northern Pacific	North Coast 55.75-2331-41.8	North Coast 57.25-2344-40.9	North Coast 58.5-2335-39.9	North Coast 73.2-2335-31.9	Northern Pacific Exp. 74.25-2342-31.5	
30	Montreal-Vancouver	Canadian National	Continental Ltd. 82.5-2930-35.5	Continental Ltd. 82.6-2929-35.5	Continental 83.1-2882-34.7	Imperial 98.75-2886-29.2	Pacific Exp. 112.5-2897-35.8	30
		Canadian Pacific	Dominion 82.8-2882-34.8	Dominion 83.1-2882-34.7	Imperial 98.75-2886-29.2	Imperial 111.25-2886-25.9		

**Total times and mileages of fastest trains on each run** 594.85 hours—30,266 miles  
**Average speed maintained by thirty fastest trains** 50.9 miles an hour

1 When two or more trains of same railroad maintain schedule listed in the table, the name of but one appears. Example: New Haven has two 4-hour trains between Boston and New York, Merchants and Yankee Clipper.  
2 The present, Gulf, Mobile & Ohio was the Chicago & Alton in 1940, 1930, 1920, and 1910.  
3 Operated between Montreal and Toronto as Pool Train No. 15 by Canadian National and Canadian Pacific.  
4 If schedules differ in opposite directions, the faster is listed in the table. Example: 20th Century has a schedule of 15.5 hours eastbound Chicago to New York, and 16.0 hours westbound.  
5 In 1930, Canadian Pacific also operated Trans-Canada Ltd. during the summer season only between Montreal and Vancouver. Its schedule was 86.25 hours for the distance of 2886 miles, or an average speed of 33.5 miles an hour.



from the customer's viewpoint. Designers of the Diesels, on the contrary, catered to public opinion from the beginning, and charmed it by continuing to borrow proven ideas from the experience of those who built aircraft, automobiles, and furniture. They gladly, even affectionately, embraced such features as air conditioning and fluorescent lighting, while most railway managements steadfastly resisted impairment of the *status quo* — until in due course the new ideas paid off in increased passenger revenues.

Stepping up schedules involved, of course, more than merely streamlining trains and making them more comfortable for the riders; more than improving the power plant and contriving better braking to permit added flexibility in acceleration and deceleration; more than handling passengers, mail, and express quicker at intermediate terminals. Safe operation at the contemplated superspeeds demanded expensive alterations along the right of way, such as heavier rails on more substantial ballasting, track realignments, easing of curves and changing their superelevations, reducing grades, longer crossovers and turnouts, and closer attention to the manifold details of bridge and track maintenance. Nevertheless, noteworthy progress both here and abroad was accomplished toward faster averages during 1933–1938.

As previously cited, by 1938 aggregate train miles booked at 60 miles per hour and over reached a world total of 93,312, of which 48,164 miles were run on American rails. These figures, in themselves indicative of a mounting tempo, included, respectively, 10,169 and 4,415 miles booked to operate at 70 miles an hour or better. Whereas *Cheltenham Flyer* and *Fliegende Hamburger* were isolated entries in the 1933 statistics, the 1938 records of running at 70 plus, besides 4,415 miles in the United States, included 3,043 miles in Germany, 1,850 in France, 730 in Great

Britain, and 131 in Italy. Still more striking is the fact that the American and German 1938 figures included for each country more than 1,000 miles scheduled to be run at 75 miles an hour and over, with two runs in each country being at over 80. In 1938, all trains run at 75 and upwards were Diesel powered, the fastest steam train then being *The Hiawatha* of the Milwaukee, averaging 73.9 on its southbound run of 43.1 miles between New Lisbon and Portage, Wis.

Thus, as events marched onwards in the summer of 1939 towards the commencement of World War II, if one craved a ride on a train at better than 80 miles an hour between two stops, the wish could be gratified either in Hitler's Reich or in the freedom of the Nebraska prairies — either via *Fliegende Kölner*, which ran 109.6 miles from Hannover to Hamm at an average of 82.2, returning at 81.2; or via Union Pacific's eastbound *City of Denver*, averaging 80.3 for 95 miles from North Platte to Kearney, and 81.4 for 62.4 miles from Grand Island to Columbus. If one were content to do less than 80 yet wanted better than 75 miles an hour, there were 15 daily opportunities, plus four available twice-a-week, and still another offered 20 days of each month, viz.:

Nine daily opportunities occurred on Nazi trains, one on the French *État* between Paris and Longueau (78.2 miles at an average of 75.7), three on *City of Denver* (excluding the above-mentioned pair at over 80), and two on Burlington's *Denver Zephyr*, in either direction between Aurora and Galesburg in Illinois (124.5 miles, averages: westbound 77.8, eastbound 71.1). Three twice-a-week chances were provided by Santa Fe's *Super Chief* and *El Capitan* on runs east or west from Dodge City, Kansas; and a fourth by eastbound *Super Chief* from La Junta, Colo., to Dodge City (202.4 miles, average 78.3). The 20-times-a-month offerings were on Union Pacific's *Cities of Portland*, *San Francisco*, or *Los Angeles*, which then ran on trios of successive days, eastbound North Platte to Grand Island (137.2 miles, average 77.7).

To summarize: 10 years ago, in 1939, there were 25 runs (18 operated daily) of 18 different trains scheduled at 75 miles an hour or over, including 14 runs (7 daily) of 7 different American trains. Ten years later, in October of 1949, there were 34 runs of 21 different trains scheduled at 75 miles an hour and over, as enumerated in the table "Trains Booked to Operate Daily . . ." All these 21 trains now operate daily customarily, by Diesel power on American railroads; and the fastest postwar Europe run up to last summer was that by a French National train, *Number 7*, between Poitiers and Angoulême, 70.2 miles at an average of 63.8 miles an hour.

Sustained accomplishment by trains between their major terminals, figured without deduction for intermediate stoppages, however, is of greater significance to more people than are bursts of speed performed over segments of the route. Eastbound *New England States*, for example, now departs from Chicago each afternoon destined to deliver passengers at Boston 18 hours later, making 1,019 miles at an average of 56.6 miles an hour. Rightfully it should be cause for pride to all concerned that this train is booked to cover the 26.7 miles between La Porte and South Bend, in Indi-

Trains Magazine



ana, in 19 minutes, thus averaging 84.3 miles per hour which at the present time is the world's fastest start-to-stop booking.

But eastbound *New England States* pauses briefly at La Porte and South Bend only to take on passengers for Toledo and beyond; and hence, from the standpoint of public convenience, the speed the *States* attains between these two Hoosier communities is relatively of little direct consequence even to their inhabitants. Its ultrafast operation over this and other intermediate stretches of its total route, however, does have an indirect bearing on the convenience of people in Chicago who want to get to Boston — for, by the present-day *New England States* that transit can be made in one hour less than by the *States* of 1940, four and a quarter hours less than by the *20th Century* of 1930 or 1920, and two and a half hours less than by the *20th Century* of 1910.

Corresponding comparisons for the period 1910–1950 giving the times, distances, and average speeds maintained on 30 representative fast runs between metropolitan centers in the United States and Canada, runs aggregating a mileage of over 30,000, are given in the table on pages 152 and 153. These tabulations, which bring up to date similar data compiled and published by *The Review* in 1940 and 1930, include runs ranging from the 227-mile New York–Washington service to that of 2,930 miles between Montreal and Vancouver. The 30 runs used divide into groups according to their mileage as follows: a third vary between 200 and 475; about a third, between 475 and 1,000; five are between 1,000 and 1,200; and six are over 2,000.

A summation of the hours and mileages of the speediest trains on each of the 30 individual runs at the beginning of the 1950's indicates a combined average of 50.9 miles an hour, an advance of 2.8 (6 per cent) and 10.8 (26.5 per cent) miles an hour, respectively, over the 48.1 and 41.1 averages of 1940 and 1930. For 1920 and 1910, the corresponding combined averages were, respectively, 34.25 and 34.77. Corresponding summations for the subdivisions mentioned above show the decline in average maintained speeds following World War I (between 1910 and 1920), except for the longest runs; the rises during each of the two decades spanned by 1920–1940; and the further post-World War II rises in the latter 1940's:

	Number					
Group	of runs	1950	1940	1930	1920	1910
200–475 miles	10	56.7	55.6	47.2	40.5	42.3
475–1,000	9	51.1	46.1	41.8	35.5	36.5
1,000–1,200	5	56.3	55.5	46.1	41.3	45.2
Over 2,000	6	47.6	45.1	37.8	30.5	29.9

It will be observed that the combined net time savings on the 30 runs by the fastest trains of 1950 over those of 1940 totaled 35.4 hours, a net gain of over 5 per cent. On five runs no time-change took place; 21 are now faster, and four have been slowed. Of the 21 runs which have been speeded up, least impressive is a gain of one hour in the Montreal-Vancouver service, one of the few trains listed in the table on page 153 still depending on steam. Should the data for this run be disregarded, on the grounds that it no longer deserves treatment as a "fast" run in comparison with

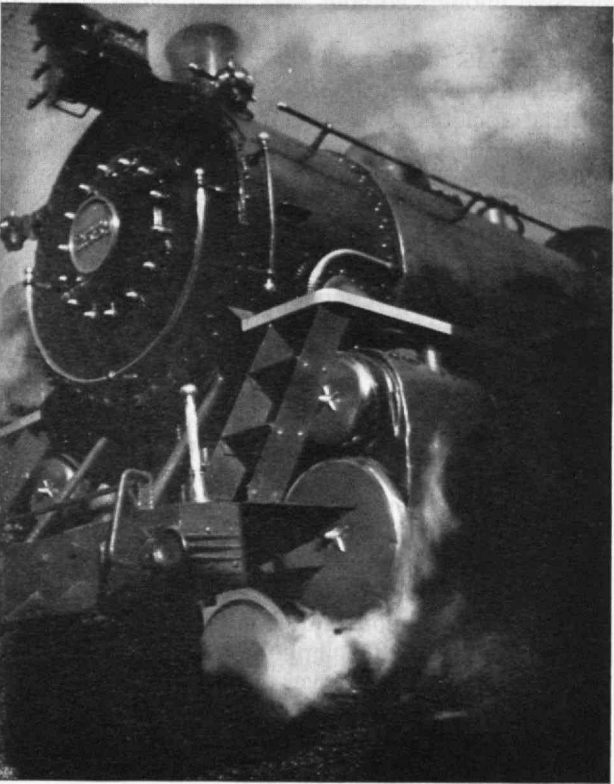
the other 29 runs listed, then the combined averages for the remaining 29 runs would become 53.3 and 50.0 miles an hour, respectively, for 1950 and 1940. On the four runs which have been slowed since 1940, the effect of their time-loss (totaling one and one tenth hours, principally through an extension of a half hour in the eastbound schedule of *City of Denver*) upon the combined average of the 30 runs in 1950, has been to hold it at 51.0 miles an hour instead of permitting it to rise to 51.1.

Although this survey is concerned primarily with railway speeds attained in the United States and Canada, it will be of interest to conclude by giving comparable averages between some European metropolitan centers — as they stood last summer and during the summer of 1939 before the outbreak of World War II, and as they were back in 1930. In the United Kingdom, for example, *Coronation* (London-Edinburgh) and *Coronation Scot* (London-Glasgow), which were maintaining respective averages of 65.5 and 61.7 miles an hour in 1939, have not been as yet rescheduled postwar; but *Flying Scotsman* and *Royal Scot* still depart from London daily at 10:00 A.M. — the hour at which *Royal Scot* has been appointed to leave each morning since 1848! The comparative averages of these two last-named trains, and of two others on higher-speed English runs, are as follows:

		Average miles an hour		
London to:	Miles	Train	1949	1939 1930
Edinburgh	393	<i>Flying Scotsman</i>	46.8	56.1 47.6
Glasgow	401	<i>Royal Scot</i>	45.6	57.3 48.5
Liverpool	193	<i>Merseyside Express</i>	49.4	58.2 48.0
Plymouth	226	<i>Cornish Riviera</i>	50.2	55.2 55.2

French timetables of 1949 include but two services, from Paris to Lyon or Bordeaux, calling for operating  
(Continued on page 180)

Jacqueline Briggs from *Black Star*





# The Twentieth Century

## Mid-Point

*Accomplishment in Science and Engineering Looms Large  
in a Look Backward upon 50 Fabulous Years*

By PAUL COHEN

As the earth swings into the orbit that will mark the first year of the sixth decade of the Twentieth Century, A.D., a look backward at the last 50 fabulous years seems in order. The occasion is a routine mathematical occurrence marking the arrival on the calendar of the year 1950. Amid today's frenetic rush of events, however, any excuse to turn for a moment and take stock of the tide of achievement that seems to be overwhelming us appears to be a valid one, and to *The Review*, whose life has been coincident with this period, the occasion is particularly appropriate. The reference here is primarily to the accomplishments of science and industrial technology. From the vaster issues of history—the advance, if any, in human rights and happiness, in wisdom or world stability—the author shies away without apology.

The first difficulty is to peer beyond the dazzle of the immediate moment, and to assess, on a thumb-nail scale, the world of 1900. For the statistically minded, the brief table of data for a few selected topics (page 157), provides some significant comparisons. The changes that have since occurred are impressive enough without seeking an older frame of reference.

For all its gaslight and horseless carriages, the United States of 1900 was already a mature industrial society, containing within itself, in full or embryonic form, most of the features that we today call the modern aspects of our economy. The population of the Continental United States in 1900 was just under 76,000,000, almost exactly half that of today. In their main features, the sanitation practices that mark urban living today were largely in effect, and these, plus control of many of the more important epidemic diseases had resulted in raising the average span of life for white persons to about 50 years. Today the figure for our tougher sex, the women, has reached the Biblical three score and ten.

As for technology, the industrial revolution had already been in operation for more than a century, and even in 1900 it was stretching a point to call such a hoary institution a revolution. True, in all of the United States there were only 8,000 automobiles, no airplanes, and not a single radio set.\* There were, however, 1,300,000 telephones and a sufficiently complete telegraph net over the country so that, after

the World Series contests started in 1903, nearly the entire American population could cluster around the bulletin boards every fall as, inning by inning, the games slipped into the record books. It was not until 1911 that the total number of patents issued in this country reached the million mark. It stands currently at over 2,400,000.

Representing an average consumption of about three and a half tons per capita per year, the production of coal was about 270,000,000 tons in 1900 and climbing steadily. Our production per capita today is not much larger,† but of course energy consumption has increased much faster than these figures would indicate. Instead of the slightly less than 8,000 trillion British thermal units which the American people used with rather low efficiency in 1900, our consumption today is in the order of 36,000 trillion British thermal units and still going up. Oil consumption has increased enormously (about 28 times since 1900), and hydroelectric power today is at least three times as great as in 1910, when it was already beginning to feel the stimulus of advances in water turbines and in the long-distance electrical transmission of energy. The latter owes its start to a Nineteenth-Century invention, the electric light. By 1920 the practicality of transmitting electric power by high voltage A-C methods had been established for distances up to 200 miles. As the small, isolated steam power plant faded as a major industrial unit, power production began to be dominated by huge central stations, whether steam or hydroelectric.

The incandescent electric lamp can also lay a claim, though rather a thin one, to some of the parental responsibility for the rayon industry. In the days of the carbon filament, manufacturers of cellulose nitrate (celluloid) and of regenerated cellulose (viscose) made filaments for this application. Commercial production of artificial silk (renamed rayon in 1924) started in France in 1891, but for the next 15 years remained a fabric more noted for defects than for virtues. Since then the use of synthetic textiles has grown enormously, overcoming their earlier difficulties so thoroughly that some of them have displaced cotton in many of industries' toughest applications, such as in truck and airplane tires. In 1938, before the rise of nylon, vinyon, and the most modern synthetic fibers, rayon for the first time exceeded wool consumption, and represented slightly less than 10 per cent of the total weight of all textile fibers used that year in this

† It was about four and a half tons per capita in 1945.

\* Marconi had reported bulletins of the American Cup Races by radio in the fall of 1899, and opened his station at Wellfleet, Cape Cod, on January 19, 1903.



country. In nylon and its functional, if not chemical, cousins, man has for the first time produced fibers superior in many physical properties to the finest natural fibers.

Changes have occurred also in a field still closer to us than our clothes, namely, in food habits, as Fred-eric W. Nordsiek, '31, pointed out in *The Review*† for May, 1947. We continue to eat about as much, in calories, as we did in 1900, or to be more accurate, in 1909 when the Department of Agriculture began to keep records on food consumption. But we eat much more of the "sissy" foods, such as milk, oranges, toma-toes, leafy green and yellow vegetables, and sugar. We are eating much less of such foods as potatoes, bread, cereals, and apples. Obviously, the total amount of food consumed today is just about twice what it was in 1900. But the output of the food-manu-facturing industry — processed food — has quad-rupled since 1899. Advertising, a force not unknown to the Americans of 1900, has played its part in these changes, sometimes along the same lines as medical thinking, sometimes on its own, but the major causes have been technical factors that were in evidence in 1900, though they had not yet begun to operate on a farm or consumer level. Canning was publicized in 1810, refrigerating machinery invented in 1880, and pasteurization known since Louis Pasteur devised the

process to prevent deterioration of wines, beers, and milk. The apparatus to process foods to near sterility and to preserve them in that state through the slow and intricate channeling from producer to consumer had to be designed, built, and distributed on a national scale. Until 1921, for example, when about 5,000 units were made, there were virtually no mechanical refrigerators in domestic use. For many perishable foods, high-speed and refrigerated trans- portation was an essential preliminary to widespread use, and every improvement in fast, flexible transport (the motor truck being the prime example) has added new delicacies to our tables. The airplane has added avocados from Cuba, tropical flowers from Hawaii, and raised talk of such exotic delicacies as mango- steens for breakfast. Queen Victoria offered a small fortune for a mangosteen delivered fresh to her table, and found no takers.

A list of such changes could go on indefinitely. The rise of the gasoline era, as Isaiah Bowman calls this day of the automobile, has so increased the mo- bility of the general population that a creature known as a suburbanite has sprung up. An associated effect, with wide implications for distribution and real- estate values, is the chronic and apparently incurable traffic jam that is afflicting virtually every large Ameri- can city, and is spreading to the larger cities of South

(Continued on page 174)

† "America's Changing Food Pattern," page 401.

### Some Significant Changes in the United States During the Twentieth Century

Item	1900 Amount	Present Amount	Year	Factor of Change*
Population, Continental United States	75,994,575	150,000,000	1949	1.97
Years of Life Expectancy at Birth, White Males	48.23 <sup>1</sup>	65.1	1946	1.35
Years of Life Expectancy at Birth, White Females	51.08 <sup>1</sup>	70.3	1946	1.37
National Income Produced (millions of dollars)	19,100	160,700	1945	8.42
Number of Gainfully Employed Civilian Workers	29,025,000	59,214,000	1948	2.04
Total Membership in All Unions	791,000	15,600,000	1948	19.7
Total Energy Supplied (trillions of B.T.U.)	7,905	36,030	1945	4.55
Electric Energy Production (millions of watt-hours)	5,969,051 <sup>2</sup>	271,254,896	1945	45.5
Coal Production, Bituminous and Anthra- cite (tons)	269,684,027	632,551,236	1945	2.35
Pig Iron Production (tons)	15,443,951	53,224,213	1945	3.45
Steel Ingots and Castings (total long tons)	10,188,329	71,162,186	1945	7.00
Railroad Passenger Miles (thousands)	16,038,076	91,826,353	1945	5.73
Vehicle Registrations (automobiles, busses, and trucks)	8,000	40,622,264	1948	5,072
Enrollment in Colleges and Universities	237,592	2,338,226	1947	9.86
Membership in Engineering Societies	8,505	190,000	1949	22.3
Employees in Executive Branch of Federal Government	208,000	3,769,646	1948	18.1
Total Federal Expenditures (dollars)	520,860,847	100,404,594,686	1945	1,920
		39,326,072,233	1948	755
Gross United States Public Debt (millions of dollars)	1,263	252,292	1948	200
Per Capita Debt of United States Govern- ment (dollars)	16.60	1,721.45	1948	103.6

\* Present amount divided by 1900 amount.

<sup>1</sup> For 1900-1902

<sup>2</sup> For 1902

Wherever possible, data is taken from *Historical Statistics of the United States* (U.S. Department of Commerce, 1949)

# Mineral Depletion and Metal Supply

*During the Past Half Century More Minerals Have Been Mined Than in All Prior History, and the Rate of Consumption Is Still Rising Rapidly*

By EVAN JUST

**M**ODERN civilization depends on minerals so greatly that it is difficult to imagine what our surroundings would be if minerals in common use were virtually unavailable. Presumably, with our highly organized methods and scientific knowledge, we would live more comfortably than aborigines, but there can be no doubt that the material living standards which we have come to regard as essential depend very heavily on minerals. In an imaginary nonmineral world we would at least have to dispense with such commonly used conveniences as railways, automobiles, telephones, electric light and power, furnaces, china and glass, and large buildings.

These conjectures become of more than academic interest when we look at the problem of metal and mineral supply in a quantitative way. On the consumption side, it may be startling to realize that, for the world's white population, the per capita requirements for minerals have multiplied 30 times in 30 years, or that more minerals have been mined in the last 40 years than in all prior history. On the supply side, we have the estimates of the Department of the Interior that our known and inferred reserves of several commercially important minerals are definitely limited to the following: In terms of average annual production for the 1935-1944 decade, petroleum reserves should last for 40 years; copper, 25 years; lead, 15 years; zinc, 24 years; and direct-shipping iron ore, 15 years. To this I would add that a quantitative analysis of the way we are depleting or polluting a precious resource, good underground water, is in itself some cause for concern. The Californians seem to be learning the value of good water supplies!

The Strategic Materials Division of Economic Cooperation Administration was set up because Congress was so deeply concerned over reserve depletion that it insisted there must be some return for Marshall-Plan aid, in the way of availabilities, if not of actual deliveries, of "materials in which the United States is deficient or potentially deficient." Congress is greatly interested in protecting the future resource position of the United States.

Do these ominous statements mean that civilization shortly will be forced to alter its ways profoundly? Must we, in a few generations return to horse-drawn vehicles, candlelight, and handicraft industry? Must we relinquish the privilege of slaughtering other people by the millions and gratify our

blood lust only through individual combat? Parenthetically when I reflect on air warfare, atomic bombs, or even what insistent nuisances the telephone in my office and the radio at home have become, I could stand for some of these handicaps with cheerful resignation!

My answer to the question posed is that, even assuming that the bulk of the earth's population adopts the mode of life common in North America and Western Europe, thus skyrocketing the world's mineral requirements, we shall suffer no serious inconveniences or interferences with material progress for lack of mineral materials. We shall be able to continue devising even more fiendish ways of destroying each other.

This conclusion is supported by the inefficient manner in which our mineral resources have been used in the past. In the first place, we tolerate wastes that, if curbed, could contribute immensely to extend our mineral supplies. Having no conscience in regard to posterity that prevents our using tin for dog-food cans, sinking battleships for target practice, or allowing immense soil and fertilizer values to drain into the ocean, we at least know that, at a price, these wastes can be avoided and even a good deal of material now wasted will be reclaimed. I would like to point out here, however, that important percentages of even so-called indestructible metals, like gold, silver, lead, and copper, are irrevocably lost in their first services to society. In other words, we cannot relax under the illusion that eventually we will fill our metal needs by turning over a great scrap pile.

We are lucky enough, furthermore, to have substitutes with plenteous reserves behind them for most, if not all, of the uses of our scarcer minerals. For our present needs of iron and steel we have great supplies of lower-grade iron ore which can continue to fill requirements for many generations and, thanks to the metallurgists, at surprisingly small additions to cost. The rather limited deposits of high quality ferroalloy minerals can be greatly extended when the metallurgists become less selective about quality and condescend, at a price of course, to use lower-grade supplies. In its most essential use, electrical conduction, copper already has a formidable competitor in aluminum. If copper should become entirely unavailable to the electrical industry, which of course will not happen, we should simply have to use somewhat larger devices to obtain similar results. Aluminum is also giving zinc producers considerable food for thought, being already a competitor with galva-

nized roofing, siding, utensils, and zinc die castings. Considering that it is made from high-grade bauxite, one might say that aluminum itself does not exist in boundless reserves; but between the probabilities that much undiscovered bauxite exists and that metallurgists will find ways to use lower-grade aluminous materials, it is hard to foresee a dearth of aluminum.

One of the most tenacious applications of the metals is lead for storage batteries, as we have no effective substitute. True, there is the nickel-steel alkaline battery, but should it be asked to take over the load now being carried by lead batteries, we would run into the fact that nickel is much scarcer than lead. Pending the day when an effective substitute for lead in storage batteries is developed, it appears that here is at least one important instance when a dearth of the material would force us to change our ways. Are the obviously short reserves of lead, then, an ominous sign? The answer is "No." In the first place, lead has reasonable substitutes in the construction, plumbing, chemical, paint, cable covering, and weighting fields, so that the apparent supplies could be extended very far, if devoted to storage batteries alone. Besides, for a sufficient price incentive, the lead in storage batteries is almost 100 per cent reclaimable. Finally, a substantial increase in the price of lead, still well within the means of storage-battery users, would bring out new supplies from all over the world. Therefore, even in this unusual case of a monopolistic hold on a market and an apparently short supply, there appears to be no cause for consumers to worry about the future. Because of its limited reserves, durability, and wide usefulness, lead may be an appropriate item for hoarders who fear currency depreciation; but the needs for its more essential uses will be met, and at prices which although possibly high in comparison to the past, will still be well within the reach of the ordinary consumer.

Another apparently essential mineral use is that for manganese as a clean-up agent for steel. This country uses 14 pounds of manganese for every ton of steel produced, and Europe uses more. I have so much observed the ability of metallurgists to find answers when needed, that I have complete faith that we shall never lack good steel, even if manganese becomes relatively scarce.

Indefatigable metallurgists are constantly working—and achieving results—toward bringing new metals within the economic sphere. Some of these metals are backed up by very abundant reserves. Aluminum is, of course, a hackneyed example, and magnesium is well on its way. It is worth noting here that the last-named metal is produced most cheaply from an inexhaustible source, sea water. Now also, we have titanium showing such promise that prudent industrialists are spending millions of dollars to hasten its economic applications.

The development of new metals presents challenging tasks to an army of metallurgists who are delving into ways of producing them more cheaply, alloying them more usefully, and equipping industry to applying them more effectively. In modern society no one man has more than a small segment of this extremely ramified job, and the blind experimental alleys vastly

outnumber the roads by which progress is achieved. Nevertheless, to participate in bringing new materials to the workshops (and thus enabling industry to make new offerings of better living to more people) is certainly an inspiring basis for a career. I wish only that the benefits of these accomplishments could be more widely utilized. In too large measure, it seems to me, we become the slaves, rather than the beneficiaries, of the system we are creating, or waste the advantages placed at our disposal in mere time-killing amusement, to say nothing of our aptitude for using the accomplishments of science and engineering for destructive purposes.

The plastic and glass industries are also making important contributions toward offering substitutes for many applications of the metals. These items are already in such common use that it is superfluous to recite specific examples.

Thus, we can look to the metallurgists and other technologists to cushion our economy against shortages by developing substitute materials that will enable us to use dwindling supplies of the metals, if they occur, for the more essential uses. If there is any fundamental cause for concern over resources, it lies in pollution of the atmosphere, in water supplies, or in the depletion of soil and phosphates. These items may become limiting factors to human growth in due time. However, more effective conservation of these resources can greatly postpone the day of reckoning.

Then, there is the role the prospector and miner can play in discovering new mineral reserves. I use these terms rather than "geologist" and "mining engineer" because I think we are too inclined to emphasize technically trained personnel in this activity, without realizing that a large share of the accomplishment, probably the major part, is due to people whose equipment is essentially common sense, experience, or managerial skill. Most informed people believe that there must be more economic minerals undiscovered than discovered. Nobody knows how far the new type of geologist, heavily fortified with physics and chemistry, may push extrapolative geology, or how effectively geophysical and geochemical prospecting may disclose concealed deposits. On the other hand, considering the depths to which mining is pushed and the extent to which we continue to rework and exploit old districts, it would be rash to predict when well-mineralized areas will be finally exhausted.

We now come to a factor in this picture which, although simple and self-evident, is usually overlooked in discussions of depletion and its effect on human progress. This factor is price, and its impact on activity. Often there seems to be too much consideration of technological accomplishment without weighing the strong control exercised by prices. We should have much fewer chances to apply new machines and methods in industry except for the insistence of workmen on higher and higher prices for their labor. Indeed, I fear that the increased output per worker which has been achieved during and since World War II may result in serious social problems before very long.

*(Continued on page 170)*



# THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

## **Assistant Treasurer for Alumni Association**

UNANIMOUSLY and enthusiastically the Executive Committee of the Alumni Association, at its meeting on November 28, voted the appointment of Madeline R. McCormick to the new post of assistant treasurer of the Association. This action requires certain changes in the bylaws of the Alumni Association as stated in the report of the Council meeting presented in this issue of *The Review*. When these changes are voted by the Alumni Council at its January meeting, the new post will be effective and retroactive as of January 1, 1950.

Educated in the public schools of Portland, Maine, Miss McCormick was first associated with the Institute in 1919 in the office of the Educational Endowment Fund which was then under the direction of the late Merton L. Emerson, '04. A year later, she joined the staff of the Alumni Association and began her recordings of the financial accounts of the Association and *The Technology Review*. Walter Humphreys, '97, Secretary of the alumni organization at that time, was the first of many officers of the Alumni Association with whom she worked.

Celebrating 30 years of loyal and capable service to the Association, Miss McCormick's continuous presence has been a helpful guide to the many who have held office, and particularly to the individuals who have been secretary and treasurer. On this roster are: Orville B. Denison, '11, Secretary-Treasurer who succeeded Mr. Humphreys; President Killian and Ralph T. Jope, '28, who acted as treasurer in 1928 and 1938, respectively; John O. Holden, '24, Secretary in 1929; Laurence P. Geer, '15, Secretary in 1930; the late Professor Charles E. Locke, '96, Secretary from 1931 until his death in 1948; and the present Secretary and Treasurer, Donald P. Severance, '38.

For several years, in addition to her accounting duties, Miss McCormick has been in charge of the details of operation and the personnel of the Alumni Office. A calligrapher of distinction, and a person of sound judgment based on experience, the Alumni Association welcomes her as the first appointee to this new post.

## **Changes in Bylaws**

MEMBERS and guests numbering 119 persons attended the second meeting of the season, and the 271st meeting of the Alumni Council, which was held in the Graduate House on November 28, 1949. C. Adrian Sawyer, Jr., '02, President of the Alumni Association, presided. During the business portion of the meeting it was reported that 10 members of the Faculty and Alumni Council had visited 13 M.I.T. Clubs from Brunswick, Maine, to Havana, and as far

west as Kansas City, Mo. Henry B. Kane, '24, Director of the Alumni Fund, announced that "as of November 25, some 8,300 Alumni had contributed a total of almost \$126,000 to the current fund. In numbers this is somewhat less than last year at the same time; in amount, the same."

Parke D. Appel, '22, chairman of the Committee on Assemblies, reported that the Midwinter Meeting for the Alumni in Metropolitan Boston would be held in Walker Memorial on Saturday, February 4, 1950.

The Executive Committee recommended to the Alumni Council two changes in the Alumni Association bylaws, as follows:

Insert a new Article IX to read:

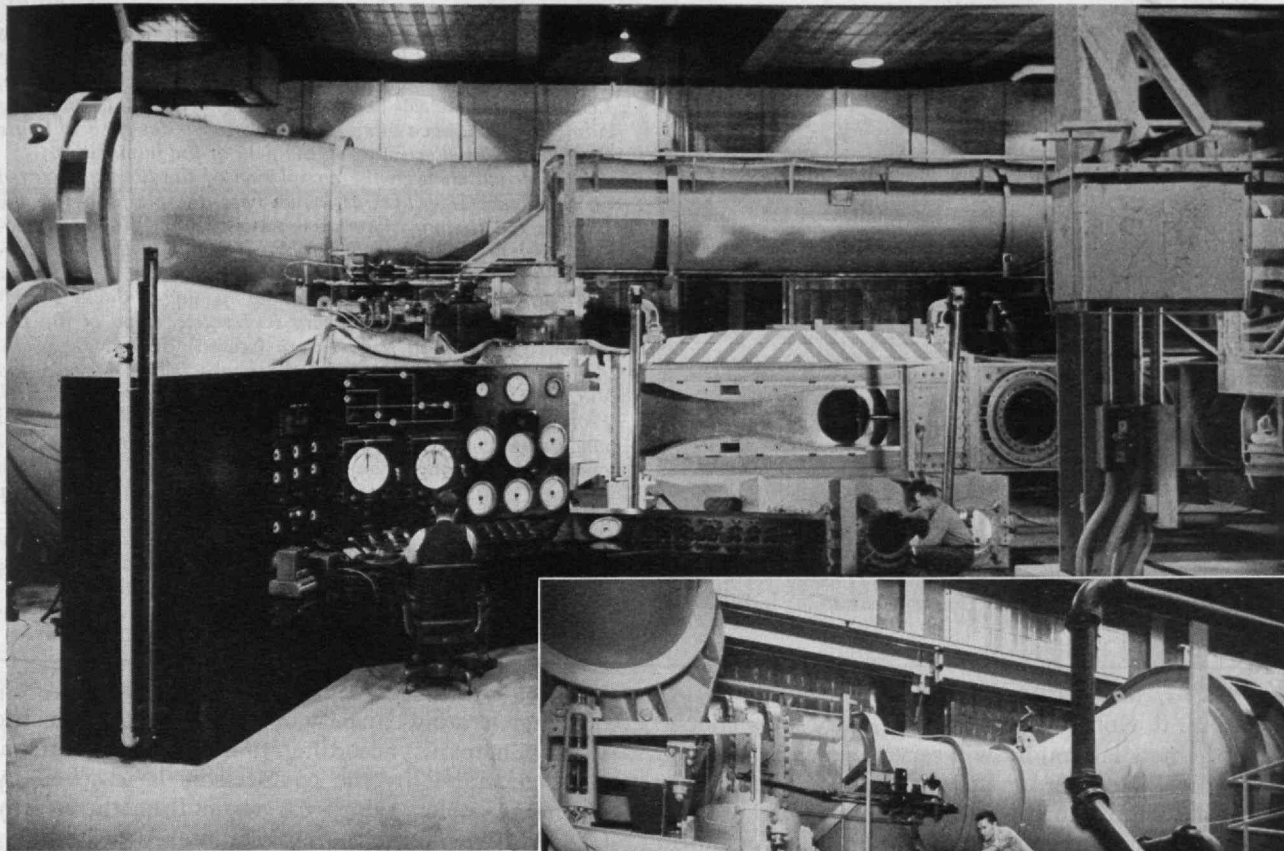
In addition to the officers of the Association provided for in Article III, Section 1, of the Constitution, the Executive Committee may appoint an Assistant Secretary and an Assistant Treasurer, who shall not be members of the Executive Committee. These additional officers of the Association shall serve subject to the pleasure of the Executive Committee and perform such administrative duties as may be prescribed from time to time. Eligibility for appointments thereto shall not be restricted to the membership of the Association.

Renumber as Article X the present Article IX which reads:

The Bylaws may be amended at any time by a majority vote of the full membership of the Council, provided thirty days' notice of such amendment has been given through publication in *The Review* or by mail to the full membership of the Council.

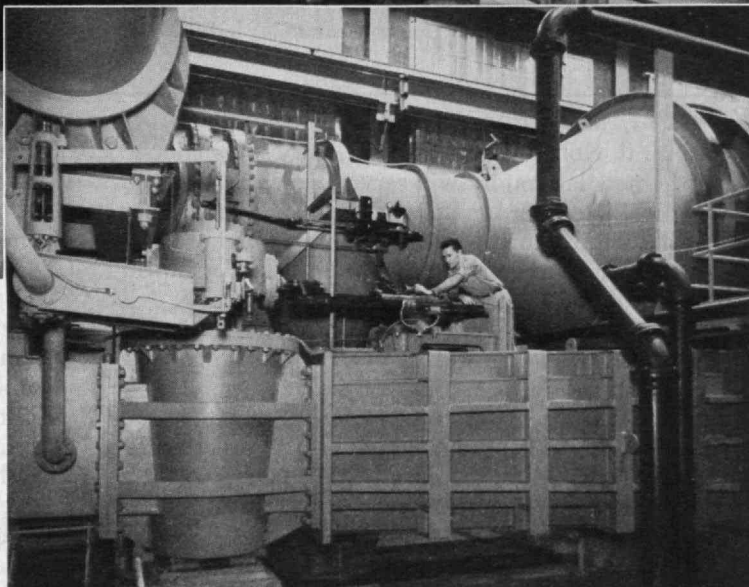
This recommendation for changes in the bylaws could not be voted on at the November Council meeting, and since there will be no December meeting, because of the Christmas holidays, they will be voted on at the January, 1950, meeting of the Alumni Council.

Malcolm G. Kispert, 2-44, Administrative Assistant to President Killian, presented a résumé of recent developments at the Institute. He announced that a student convocation would be held in the Rockwell Athletic Cage on December 5 at which President Killian would acquaint the student body with the Institute's Development Program, Nathaniel McL. Sage, '13, Placement Officer at M.I.T., would speak on student placement, and Vannevar Bush, '16, President of the Carnegie Institution of Washington, would address the students on "The Essence of Security," which appears on page 147 of this issue. Mr. Kispert announced plans for the dedication of the supersonic wind tunnel at M.I.T. He also reported that Norman B. Champ, '50, had been named student chairman for Open House activities to be held next spring. Mr. Kane was named chairman of the Staff Advisory Committee for Open House.



M.I.T. Photos

General view of the Naval Supersonic Wind Tunnel at M.I.T. (above) which was dedicated on December 1. Observations of models in the high-speed air stream are made through a circular window in the cover of the test section, shown in the center of this illustration, whereas all operations are controlled from the console in the foreground. A graduate student (at right) operates a plug valve at the end of the test section of the wind tunnel capable of producing velocities up to four times that of sound propagation in air, or close to one mile per second.



Harold L. Hazen, '24, Head of the Department of Electrical Engineering, then introduced the speaker of the evening, Professor Harold E. Edgerton, '27, of the same Department, who discussed and demonstrated the operation and uses of flashlight photography and stroboscopic light. The demonstration included the stopping of bullets in flight and the photographing of the various stages of the collapse of balloons, using the Land camera which provides prints within a minute after exposure. By means of slides, Professor Edgerton showed examples of the use of flash photography in sports, nature, the dance, projectiles in flight, and in the recording of such events as the rodeo and circus.

### ***Supersonic Wind Tunnel Dedicated***

THE largest wind tunnel at any university for research on problems of high-speed flight was dedicated on December 1, at ceremonies marking completion of the Naval Supersonic Laboratory at M.I.T. The tunnel, constructed under the auspices of the Navy Bureau of Ordnance, is designed to provide speeds ranging from 1.2 to 4 times that of sound —

up to 3,000 miles per hour; and during the dedication it was successfully operated at a speed twice that of sound.

Speakers at the dedication program included: Rear Admiral Albert Noble, '23, Chief of the Navy Bureau of Ordnance; James R. Killian, Jr., '26, President of the Institute; Jerome C. Hunsaker, '12, Head of the Department of Aeronautical Engineering; Edwin G. Schneider, Director of M.I.T.'s Project Meteor; and Professor John R. Markham, '18, Director of the Laboratory. Hugh L. Dryden, Director of Research, National Advisory Committee for Aeronautics, was the principal speaker at a luncheon in the Graduate House following the opening ceremonies. Guests at both events included high officials of the Navy, Air Force, Army, aircraft industry, and several educational institutions.

The Naval Supersonic Laboratory, including building, wind tunnel, and associated instruments, represents a capital investment of \$2,600,000. It marks a substantial increase in the laboratory facilities of the Institute, Dr. Killian reported, and will be devoted to both fundamental research and education.





M.I.T. Photo

One of the Institute's newest and finest buildings, the Charles Hayden Memorial Library, is being completed in progressive steps. In August, the Departments of English and History, Economics and Social Science, and Business and Engineering Administration moved into a wing expressly designed to house those educational activities in the field of the humanities.

The second stage in the completion of the library occurred on November 18, when, as shown here, the first books of the English and History Library were moved from Walker Memorial to the first reading room to be completed in the new Hayden Library.

Taking part in the simple, informal opening of the new reading room are: Professor Howard R. Bartlett, Head of the Department of English and History (seated); Robert E. Booth, Associate Librarian, watching the books being stacked; and Vernon D. Tate, Director of Libraries, in conversation with Professor Bartlett. Transfer of approximately 16,000 books was made during the week end, and the new reading room was opened for student use on November 21. Already it has proved to be a popular reading room for recreation and study by M.I.T. students.

The remaining portions of the library are still under construction, but are expected to be completed during the late winter. The library will be formally dedicated next spring.

Admiral Noble expressed the Navy's confidence that the new laboratory will serve science as a tool to extend the frontiers of human knowledge, and that it "will inspire future generations of students to more intensive study and assure our country leadership in the field of aeroballistics."

"The tunnel," he said, "represents the most advanced design in our present thinking. It is one unit in a great nationwide complex of laboratories and plants engaged in devising and in making the weapons with which the Army, the Navy, and the Air Force will defend our country."

Professor Hunsaker reported that the Naval Supersonic Laboratory will be used for testing scale models of supersonic missiles and components, and for research to obtain basic aeroballistic information. Results of the research completed in this wind tunnel should make possible improvements in high-speed missiles and aircraft of both piloted and automatically guided types. An extensive training program for advanced students at the Institute will be undertaken in conjunction with the laboratory's research.

The test section of the new wind tunnel, where models are studied in the high-speed air stream created by the machine, measures three square feet (18 by 24 inches). By changing the density of the air passing through the test section, conditions of guided missile and airplane flight at high altitudes can be duplicated. The wind tunnel is capable of sustained high-speed operation and is therefore suitable for the study of problems which require equilibrium conditions, Professor Markham pointed out in a brief description of the tunnel and its auxiliary control mechanisms.

The wind tunnel is a huge closed steel channel, through which very dry air is circulated by two large centrifugal compressors driven by electric motors of 10,000 total horsepower. The four-stage compressors have been especially adapted for this application to a supersonic wind tunnel. The electric power required to operate the wind tunnel represents a large fraction

of the generating capacity of the Cambridge Electric Light Company, according to Professor Markham. Heat generated by the compressors is removed by two large coolers which use water from the nearby Charles River as the cooling medium. Approximately 3,000 gallons of water per minute are divested from and returned to the river to cool the various machines within the laboratory.

Supersonic speeds are achieved by shaping the wind-tunnel walls in the vicinity of the test section in a certain specified manner, and special nozzles having the proper contours are required. Different nozzles are used for different speeds of operation. Air temperatures within the test section of the wind tunnel are quite low. At speeds twice that of sound, the temperature is  $-140$  degrees F.; at speeds four times that of sound,  $-335$  degrees F.

Instrumentation available for use with the wind tunnel includes a balance to measure the air reaction on the models and an optical system to show visually the shock waves and flow patterns which surround models in the supersonic air stream.

The wind tunnel and laboratory are under the administration of the M.I.T. Department of Aeronautical Engineering headed by Professor Hunsaker. The design of the wind tunnel, the wind-tunnel balance system, and other items of instrumentation were under the direction of Professor Markham. The Jackson and Moreland Company, consulting engineers of Boston, had charge of the execution of the project.

Design of the wind tunnel was undertaken in December, 1946, and actual procurement of equipment was initiated in the spring of 1947. Construction of the buildings started with the ground breaking by Vice-Admiral George F. Hussey, Jr., then Chief of the Bureau of Ordnance, on M.I.T. Alumni Day, June 14, 1947. Personnel of the laboratory occupied the building in June, 1948. Installation of machinery, equipment, and instrumentation has required the intervening time.

(Continued on page 164)



# BUSINESS IN MOTION

## *To our Colleagues in American Business . . .*

One of the many good qualities of copper is its ability to withstand a great deal of cold working without injury. Nevertheless, rolling, drawing, stamping and similar operations do increase the hardness of the metal. If enough of this cold work is done, it becomes necessary to anneal it, that is, heat it to the proper temperature to relieve the internal stresses and permit the metal to become ductile again, ready for additional forming operations.

Annealing is expensive, because it requires accurately controlled heat and skilled labor. For that reason it is a matter of concern to manufacturers, and Revere often is asked if it is possible to eliminate or at least reduce the number of anneals. Frequently this can be done. Take the case of a coffee pot. No less than five anneals seemed necessary in order to produce this quality product. Costs were high; could they be reduced?

The customer's metallurgist and the Revere Technical Advisory Service studied this problem in detail, attacking the matter together. When they arrived at what seemed to be a promising solution (on paper) it was proved out by exhaustive tests. It was found that by using Revere copper strip in a certain temper, four anneals could be eliminated. Now, after drawing to  $7\frac{3}{4}$  inches deep, the copper body is annealed once and for all, then spun into its final graceful shape. Based on current production, the



saving amounts to over \$10,000 a year. There are additional savings due to simplified handling in the factory. The reduction in the number of anneals also seems to have a favorable influence on the economy of the finishing operations, including tin plating inside, nickel and then chromium outside.

To make such a deep draw while holding rejects to a minimum requires skill on the part of the customer, plus careful fulfillment of the metal specifications by Revere. This is said in no prideful spirit.

There are a great many skillful manufacturers in all lines, and many careful, conscientious suppliers of everything from metals to plastics, textiles to lumber, chemicals to paper. The whole point of this particular story of the saving of \$10,000 a year poured out of a coffee pot is that it was accomplished by the most thorough kind of collaboration between the maker of the pot

and the supplier of the metal. It was that joint effort that made the saving possible.

Perhaps you do not make coffee pots. Maybe you do not buy copper, brass, bronze, nickel silver, cupronickel, aluminum, or any other Revere Metals. No matter. It may be that if you will take your suppliers into your confidence in the common cause of cost reduction you too will be able to effect savings and improve your product, just as happened in this case.

## REVERE COPPER AND BRASS INCORPORATED

*Founded by Paul Revere in 1801*

☆ ☆ ☆

**Executive Offices:**

**230 Park Avenue, New York 17, N. Y.**

### **Dean M. Fuller: 1893-1949**

**D**EAN M. FULLER, Associate Professor of English at the Institute, died on November 23, 1949. He had been at M.I.T. for two decades.

A native of Barre, N.Y., where he was born on November 20, 1893, Professor Fuller served overseas for a year and one-half during World War I. He was graduated from Hamilton College in 1920 and immediately joined the instructing staff at the Institute. He was promoted to the rank of assistant professor in 1928 and became an associate professor in 1938.

Professor Fuller was widely known among the Institute's students for his interest in debating. He had served for many years as director of dramatics and organized the Dramashop, an undergraduate club. He was a leader in the Drama Club of the Faculty and for several years gave an undergraduate course in dramatics for second-year students.

### **Nelson Award to Dr. Compton**

**P**RESENTED annually to that citizen of greater Boston who has contributed most in the field of public service, Karl T. Compton, chairman of the M.I.T. Corporation, was the recipient of the Colonel Thacher Nelson Award of the Advertising Club of Boston for the year 1948-1949. The medal was awarded to Dr. Compton in recognition of his long and distinguished career as physicist, educator, and humanitarian, during which time he has served his community and his country "in war and in peace—applying his great talents with selfless devotion in the service of his fellow-man."

The medal was accepted for Dr. Compton by George R. Harrison, Dean of Science at the Institute, at a luncheon at the Hotel Statler on November 15, at which James T. Chirurg, '27, was chairman of the day. The award was made to Dr. Compton last spring, when Carlton M. Strong of the Rumford Press was president of the Advertising Club of Boston. Presentation of the award was delayed because of Dr. Compton's frequent absence from Boston while serving as chairman of the Research and Development Board of the National Military Establishment.

### **Progress in Automotive Research**

**T**wo new developments in automotive engineering at the Institute are expected to help achieve more efficient gasoline engines. Fundamental research on how engines grow, in the M.I.T. Sloan Laboratories for Aircraft and Automotive Engines, may make it possible to obtain facts about large engines from studies of very small ones, as mentioned in greater detail on page 142. In addition, a development of the Institute's Department of Aeronautical Engineering, of a new engine indicator capable of very accurate and sensitive measurements on pressures inside an operating engine, is expected to be of

great help in efforts to improve engine performance.

Under the general direction of Professor C. Fayette Taylor, '29, of the Department of Mechanical Engineering at M.I.T., Sloan Laboratory personnel are exploring the effects of size changes in one-cylinder engines, seeking to establish the "laws of similitude" which may be applicable. The program promises to enable designers to predict with precision the changes in performance of an engine as its size is changed. It will thus provide a quantitative basis for choosing designs for greatest fuel economy, lightest weight, or minimum size.

A complementary development at the Institute, President Killian reported on November 29, is that of the improved high-performance engine indicator perfected by Professor Charles S. Draper, '26, of the Department of Aeronautical Engineering, and Yao Tzu Li, '38, a research associate in the same Department.

Although the new instrument applies commonly used strain-gauge principles for measuring pressures inside an engine, it largely overcomes the defects of previous devices. This is accomplished by the use of a curved, instead of flat, pressure-recording drum, and by refinements in the application and instrumentation of the strain gauge itself.

According to Professor Draper, the new instrument developed at M.I.T. is accurate to within 1 per cent over a wide range of temperatures, can be used to measure large variations of cylinder pressure, and yet is sensitive to very sudden pressure changes. Thus it makes possible detailed studies of the rapid vibrations and oscillations of pressure within an engine. Tests of the new instrument indicate that greatly improved performance can be expected.

Both of these developments serve to underscore the importance to industry of the fundamental research performed in educational institutions. They emphasize the "necessity of maintaining American leadership in technological education and research," President Killian declared.

### **Unity in Science**

**T**HE fourth annual Arthur Dehon Little Memorial Lecture at the Institute was given in Walker Memorial on the evening of November 22, 1949, by Detlev W. Bronk, President of Johns Hopkins University, whose topic was "The Unity of the Sciences."

The Arthur Dehon Little Memorial Lectureship was established by Arthur D. Little, Inc., in memory of its founder, and was inaugurated in 1946 with a distinguished lecture by Sir Edward V. Appleton. Other speakers have been J. Robert Oppenheimer, Director of the Institute for Advanced Study, and Robert E. Wilson, '16, chairman of the Board, Standard Oil Company of Indiana.

One of the dynamic figures in American science and education today, Dr. Bronk is a graduate of Swarthmore College and holds the Ph.D. degree in physics from the University of Michigan. Following various teaching appointments and a year of study in England in 1928, Dr. Bronk organized and led an effective group of investigators studying electrical and chemical mechanisms of the nervous system. Until 1948 he

(Continued on page 166)



Partial view of Meadowbrook Apartments, Indianapolis, Indiana. Owners: Meadowbrook Sponsors. Architects and Engineers: Allen and Kelley. General Contractor: Mars Engineering, Inc. Heating and Plumbing: Freyn Brothers, Inc. Electrical Contractor: Hatfield Electric Co. All of Indianapolis, Indiana.

## GARDEN APARTMENT COMMUNITY USES 5½ MILES OF *Webster Baseboard Heating*

Heating for the \$5,500,000 Meadowbrook Apartments, Indianapolis, Indiana, is Webster Baseboard Heating—5½ miles of it.

"The sponsors were convinced after a thorough investigation, that Webster Baseboard Heating would provide the best type of heating system at a reasonable cost for Meadowbrook tenants." So says Alvin Jones, president of Meadowbrook Corporation.

Financing for Meadowbrook Apartments was provided by a \$4,792,500 loan from the John Hancock Life Insurance Company of Boston, and insured under Federal Housing Administration 608. Rentals under FHA procedure for such a program average \$90 per month, including refrigerator, range, heat and water.

Many families are already occupying some of the 648 one and two-bedroom apartments and are enjoying the complete heating comfort and benefits of Webster Baseboard Heating. Each of the

37 two-story buildings has its own oil-fired heating unit, and every tenant has individual control of his own heating system.

With floors, walls and ceilings evenly warmed by genuine, perfected Webster Baseboard Heating, Meadowbrook Apartments heating costs are kept to a minimum. 72° room temperatures are maintained easily even in the coldest weather. Webster Baseboard Heating is *clean* heat, *convected* heat . . . radiant heat in its most practical form. Owners of Meadowbrook are looking forward to minimum fuel costs this heating season.

If you haven't already included Webster Baseboard Heating in your 1950 plans, then do so now. The Webster Representative in your locality will furnish complete details—let us give you his name.

Address Department, TR-1

**WARREN WEBSTER & CO.**

Camden 5, N.J. : : Representatives in Principal U. S. Cities  
In Canada, Darling Brothers, Limited, Montreal

# *Webster*

# BASEBOARD HEATING



# HEVI DUTY

## 1 Precision Electric Heat Treat Furnaces (Laboratory and Industrial)

## 2 Dry Type Air Cooled Transformers (to 1000 KVA)

## 3 Constant Current Regulators (Static Type)

1 Hevi Duty Precision Electric Heat Treating furnaces are built in a large variety of types and sizes — for many heat treating operations — with temperature ranges to 2500° F (1371°C). They are standard production equipment in many national industrial plants.

2 Hevi Duty Dry Type Air Cooled Transformers with or without tap changing switches as well as special transformers for special requirements.

3 Hevi Duty Constant Current Regulator (Static Type) for series lighting. To transform constant potential to constant current, using a resonant circuit with patented exclusive features. A decided improvement over any other known type of regulator.

*Write for descriptive bulletins.*

Harold E. Koch '22 President

Elton E. Staples '26 District Mgr., Cleveland

## HEVI DUTY ELECTRIC COMPANY

### HEVI DUTY

HEAT TREATING FURNACES • ELECTRIC EXCLUSIVELY  
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS  
MILWAUKEE 1, WISCONSIN

## THE INSTITUTE GAZETTE

(Continued from page 164)

was director of the Eldridge Reeves Johnson Foundation for Medical Physics and of the Institute of Neurology, both at the University of Pennsylvania.

During World War II, Dr. Bronk made a distinguished contribution as co-ordinator of research in the Air Surgeon's office, and in work on problems in the fields of oxygen and vision. Since then, as a member of the United States National Commission for the United Nations Educational, Scientific and Cultural Organization (UNESCO), he has concerned himself with international scientific and cultural problems.

Calling for a greater appreciation of "the motives and methods of science," Dr. Bronk told his audience that the success of industrial democracy depends on developing "a closer unity between the sciences and between those called natural and those called social."

He said that a discussion of the social implications inherent in the development of science is particularly timely because of the recent rapid expansion of scientific activities. Present-day culture, Dr. Bronk pointed out, is increasingly dependent upon the products of science and technology, and scientists are thus becoming "essential to our social order." This greater relevance of science to modern society tends to make scientists focus their attention on quick answers to practical questions, a fact which leads to a high degree of specialization.

Dr. Bronk added, however, that the goal of true science is more than quick answers to practical questions. Quantities of data and many individual solutions must be correlated for the development of broad new concepts.

"Science can seldom be developed by scientists who do not have specialized competence," continued Dr. Bronk, "but more than this is needed for the development of science." He stated that we need men able to "comprehend the broad relevance of detailed facts and knowledge and their human implications."

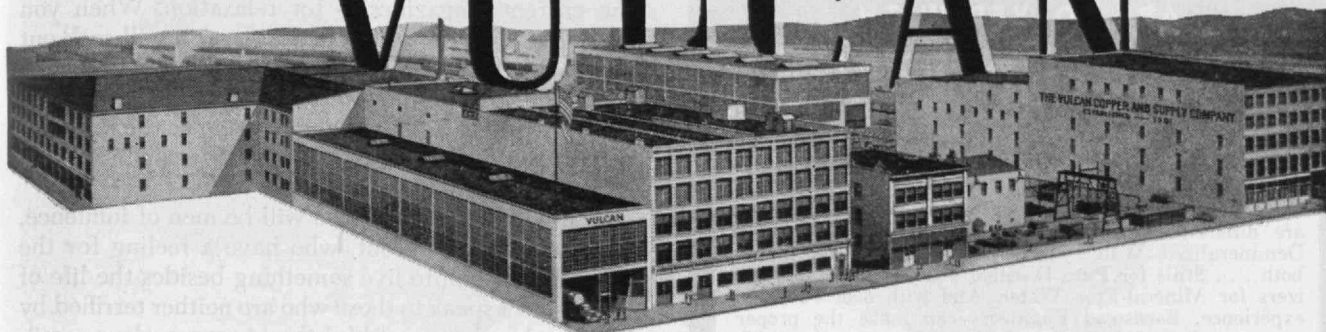
Three compelling motives of modern scientists were listed by Dr. Bronk: the primary one is curiosity, followed closely by the desire to understand and correlate observations resulting from curiosity and by the desire to create something with an ultimate social value. He believes that the cultivation of these "is the surest guarantee of scientific progress."

Dr. Bronk said that the unity of sciences and humanities required for the achievement of future objectives is to be found "in the common search for understanding, in the satisfaction of intellectual inquiry and expression, and in the enrichment of human life."

Dr. Bronk pointed out that the role of the scientist's creative imagination is to form facts and observations into knowledge which lays the foundation for further discoveries. "To bring order out of chaos and attain understanding is one of the great satisfactions for which a scientist will gladly spend his life," he said.

(Continued on page 171)

# VULCAN



*Engineers and Manufacturers*  
of  
**COMPLETE PLANTS AND EQUIPMENT**  
for  
**CHEMICAL PROCESS INDUSTRIES**

*Fabrication in Stainless and Carbon Steels, Copper, Aluminum, Nickel and Other Commercially Available Alloys:*

**ABSORPTION TOWERS, FRACTIONATING COLUMNS, EVAPORATORS,  
HEAT EXCHANGERS, PRESSURE VESSELS, REACTOR VESSELS,  
PRE-FABRICATED PROCESS PIPING, SOLVENT EXTRACTORS, VEGETABLE OIL EXTRACTORS**

*VULCAN has served the process industries since 1901. Below is a representative list of chemicals processed in Vulcan plants or equipment.*

**ALCOHOLS** Methanol — synthetic

Methanol — from wood distillation  
Ethanol — industrial grades from molasses and grain  
Ethanol — from sulfite waste liquor  
Ethanol — anhydrous, Vulcan process  
Ethyl alcohol — beverage, neutral spirits  
Isopropanol Allyl alcohol Butanol

**ALDEHYDES**

Acetaldehyde Butyraldehyde Furfural

**CHLORINATED HYDROCARBONS**

Chloroethane Chlorobenzenes Chlorotoluenes

**ACIDS** Formic acid

Acetic acid — from wood distillation  
Acetic acid — from process residues  
and solvent recovery  
Acetic anhydride Propionic acid  
Butyric acid Stearic acid

**GLYCOLS**

Ethylene glycol  
Butylene glycol

**KETONES**

Acetone Methyl ethyl ketone

**ESTERS** Methyl acetate Ethyl acetate

Butylacetate Vinyl acetate Dibutylphthalate

**HYDROCARBONS** Butadiene Heptane

Benzene Toluene Styrene Diphenyl

**PHENOLS** Phenol Naphthol

**ETHERS** Ethyl ether Isopropyl ether

**MISCELLANEOUS** Citronellal Geraniol

DDT Essential oils

# Vulcan

**distillation  
evaporation  
extraction  
processes and equipment**

**THE VULCAN COPPER & SUPPLY CO. General Offices and Plant: CINCINNATI, OHIO**

NEW YORK

SAN FRANCISCO

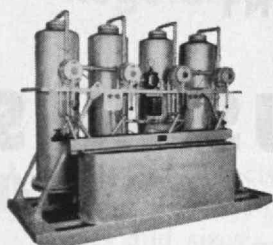
BUENOS AIRES

IN CANADA — VICKERS-VULCAN PROCESS ENGINEERING COMPANY, LTD. — MONTREAL

# INDUSTRY'S Pure Water Problems ARE SOLVED WITH BARNSTEAD EQUIPMENT

The need for Pure Water by Industry is Basic . . . there are hundreds of processes in the chemical, food, pharmaceutical, metallurgical and industrial fields where Pure Water plays an important part. But the requirements are different. Some need Distilled Water . . . others Demineralized Water. That is why Barnstead makes both . . . Stills for Pure Distilled Water . . . Demineralizers for Mineral-Free Water. And with over 70 years experience, Barnstead Engineers can make the proper recommendations for either Stills or Demineralizers OR both, to provide the correct daily flow of Pure Water to fill your needs at lowest cost.

## DEMINERALIZED WATER



Chances are that if you need high-test mineral-free water Barnstead Demineralizers can save you money. For Barnstead Demineralizers produce water of far higher purity at lower cost with a minimum of maintenance.

Whether you need 5 gallons an hour or 1000

. . . there is a Barnstead Demineralizer to fit your requirements *exactly*. And a Barnstead engineer can "plot" the course of Pure Water *precisely*. Ask for Barnstead detailed recommendations. No obligation.

## DISTILLED WATER

For the production of highest quality chemically pure, sterile water . . . For trouble-free, automatic operation . . . For distillate of unvarying consistency . . . There's a Barnstead Still to fit your Pure Water needs. And Barnstead Laboratory and Industrial Water Stills are the proven standard of the scientific and industrial world. Barnstead engineers . . . with over 70 years of Pure Water experience . . . the longest in the field . . . are ready to assist you with your Pure Water Problems.



Write for your FREE Water Survey Form Today!

**Barnstead**  
STILL & STERILIZER CO.

26 Lanesville Terrace  
Forest Hills  
Boston 31, Mass.

*First in  
Pure Water  
Since 1878*

## ESSENCE OF SECURITY

(Continued from page 148)

tegral whatever. You will read the newspapers and the current magazines — for relaxation. When you graduate, with the M.I.T. accolade, you will seek out a post that pays a salary and affords the maximum of security, where promotion is sure and slow, and where no one ever got fired who didn't criticize the management unduly. I am not talking to the small fraction who will thus dodge the issue.

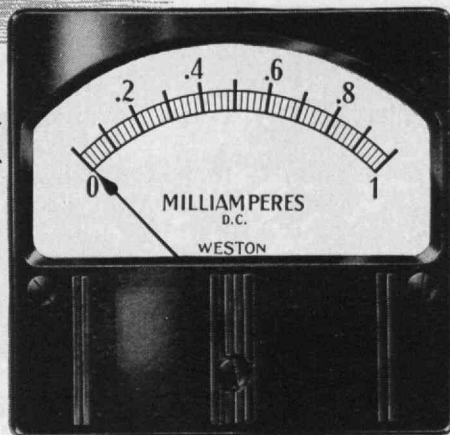
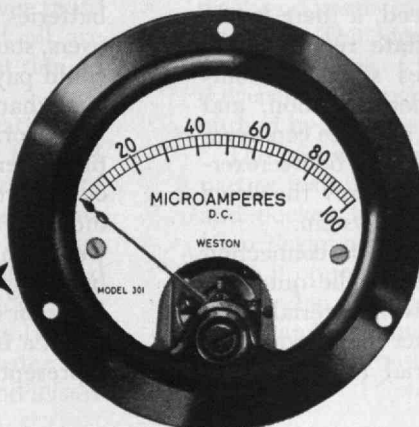
I am talking to those who will be men of influence, now and from here out, who have a feeling for the game, and a will to live something besides the life of the oyster. I speak to those who are neither terrified by life, nor lured into wishful thinking regarding a millennium. There are many such among you, as the history of this institution has proved, who would grapple with a tough world, and learn the subtle arts of doing so well. There are many among you who are men of influence today, and who are preparing to be men of great influence tomorrow among your fellows, because of your grasp, your courage, your mental power, and your integrity.

There is an unfortunate tendency in this country to separate the great and small issues; to take the point of view that the large ones are determined in Congress and the Executive Establishment and that they are no direct concern of the individual citizen, pursuing his ordinary affairs within close horizons. Nothing could be further from the truth. The characteristics of the Federal government, the dignity or the lack of it with which we conduct our affairs, internally and in the complex relations between nations, the selflessness, or its opposite, of our governors throughout our far-flung government machine, are but the reflection of the character of the people. As the people think, as they demand effectiveness or tolerate demagoguery, so will our status as a nation evolve. The smallest act of a citizen, influencing his friends and neighbors toward sanity and far-reaching wisdom, multiplied a million times throughout the breadth of this land, can determine that the country as a whole will rise in its dignity and strength to live in prosperity and peace, and not succumb in a welter of petty selfishness and confusion. This is the essence of security.

You men, with the enormous privilege of higher training, in an institution of world renown, and thousands like you throughout this country, you men of influence in the coming generation, will determine where we come out. You will specify, you men who accept the challenge of life, whether we make of this free country of ours a country that grows in freedom and strength, and whether in that strength it will lead the world out of a morass. No one of you will determine it all, or even a great part of it, for the world is large and complex and the efforts of no single man reach far unless he be singularly favored by chance and endowment. But each of you who wishes will shift the trends a bit, and is shifting them now; and together, you of youth who inherit the world, you will determine the outcome. I shall probably not be around to witness the full result, but I wish you luck.



# Trustworthy



*...in Constancy  
...in Value*

Wherever an electrical measurement provides essential information... whether in the manufacture of electrical components, the inspection of purchased parts or finished products, or in the operation of some electrical machine... far-sighted buyers specify "meters by WESTON". Experienced buyers know that in value, and in performance, there is no substitute for WESTON instruments. Ask your nearest WESTON representative for all the facts, or write for bulletin A-7-B. WESTON Electrical Instrument Corporation, 702 Frelinghuysen Avenue, Newark 5, New Jersey.

## **WESTON**

*Panel Instruments*

Albany • Atlanta • Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Houston • Jacksonville • Knoxville  
Little Rock • Los Angeles • Meriden • Minneapolis • Newark • New Orleans • New York • Orlando • Philadelphia • Phoenix • Pittsburgh  
Rochester • San Francisco • Seattle • St. Louis • Syracuse • Tulsa • In Canada, Northern Electric Company, Ltd., Powerlite Devices, Ltd.

## MINERALS AND METALS

(Continued from page 159)

The prices of the products we produce put definite ceilings on industry's chances to mine lower-grade reserves, take exploratory risks, try out new machines or methods, or finance research. However, it must be admitted that human behavior is illogical enough that we make our greatest progress when under pressure rather than when we are enjoying the most financial elbow room.

The fluctuations characteristic of price also have a profound effect on depletion and technical progress. Many experiments, whether exploratory, operative, or laboratory research, are foregone because of the fears of businessmen over price declines. Much ore is left in the ground because of selective extraction in periods of low profit margins. Indeed, if there is any justification for cartelization or state regulation of prices, it is because stable prices should encourage orderly extraction, steady mechanization, and research programs, thus promoting resource conservation. This, however, is a tool which can be overexercised, as too much protection can destroy the drive inherent in our traditional economic system.

The most interesting aspect of price in connection with resource depletion is involved in the question, "What can we afford to pay for a given material?"

There is an absurd side to the fact that a pound of valuable, durable re-usable material (such as cop-

per, lead, or zinc) costs less today than a pound of a common, single-use, short-lived, easily destructible material, such as cotton.

If the consumer can pay much more than the present price in relationship to other commodity prices, as in the case of lead, for example, broad new vistas are opened up in the way of exploratory activity, rejuvenation of old producing areas, opening of remote or low-grade deposits, increased recovery in extraction, and scrap return. Also, if a higher price is needed to produce substantial quantities of lead, some users will drop out of the market. Other dense materials can be used for weighting down fish nets or sailboat keels, less lead can be used in paints, and substitutions can be made in the construction, chemical, and cable-covering fields. Thus, a greater proportion of the present supply of lead will be available for storage batteries and similar dependent users. As for these users, startling as it may seem, it is probable that they could pay 10 times as much for lead and not be seriously handicapped.

The prices we can afford to pay for so-called essential materials finally get back to the human energy we can afford to devote to their acquisition. It seems ridiculous to say that people who enjoy five-day work weeks, in an industrial system that has but few back-breaking jobs, cannot pay 10 times the present relative price for the lead they need. Probably what they need is but a fraction of what they use, and what they use represents less than a thousandth of their earnings.

THE MILWAUKEE ROAD  
MONTANA CANYON

P O O R & C O M P A N Y  
CHICAGO

Manufacturers of Railway Equipment used by Railways throughout the world



Had they to pay 10 times as much for their needs, these would probably still require an imperceptible amount of the time now devoted to profitless amusement or the expenditures now made for superfluities. Until and unless we are back to long work weeks and arduous tasks, there seems to be little reason to become excited over the consequences of depletion.

The reader may well pose the question: "If you are so little concerned over depletion, why are you striving to help the United States build up stockpiles and safeguard its future access to raw materials?" The point is that it takes a certain amount of time for industry to adapt itself to new conditions, and these measures are designed to cushion us against being caught unprepared over the short term or in an emergency. Moreover, possession of a resource which the other fellow lacks is likely to afford a competitive or combative advantage to those who "have" over those who "have-not." The problem diminishes if all are equally well off or poor, or are given sufficient time to work out alternatives.

If we can refrain from destroying civilization, or making the world a Communist prison, the future I foresee is one of continued abundance and variety of materials, of slow, almost imperceptible changes toward using materials backed up by abundant reserves, of higher per capita consumption, and greater and greater involvement of complicated technology. We shall require, and be able to afford, more highly educated technical men. We shall receive a greater and greater inheritance of knowledge, comfort, and leisure

from preceding generations, and have more of what is commonly called better living. It may be hoped that we shall use these benefits as stepping stones to enlightened, fruitful, satisfying lives, to moral and social progress, and not become narrow or soft-minded slaves to the machines, technologies, ease, and gadgets with which we shall be surrounded.

## THE INSTITUTE GAZETTE

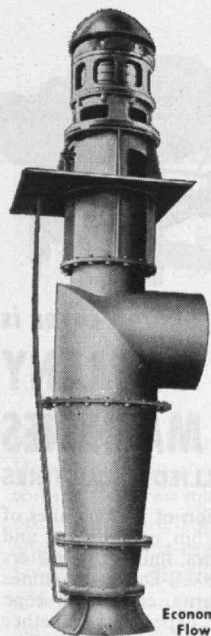
(Continued from page 166)

### Winter Sports Week End

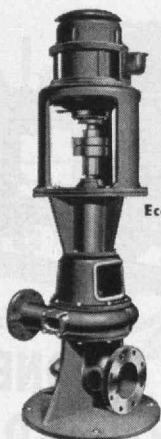
ELEVEN winter sports teams swung into action on December 2 as part of the third annual M.I.T. week-end sports carnival, popularly known as Tech's-a-Poppin. The location of the events alternated between the cities of Boston and Cambridge but the enthusiasm of the participants and guests was not diminished by the time consumed in traveling.

The gay week end of dances and fraternity house parties featured the initial contests of the basketball and hockey teams. Technology's varsity basketball team began activities on the evening of December 2 when it opposed the Boston University quintet at the Cambridge Armory, losing by a score of 57 to 37; a freshman preliminary ended with a score of 74 to 40 in favor of Boston University.

(Concluded on page 172)



Economy Axial Flow Pump



Economy Non-Clogging Sewage Pump



Economy Double Suction Pump

**ECONOMY PUMPING** makes sound sense to engineers who know the dollars and cents value of trouble-free pumping service. To pump longer, at lower cost, with less maintenance, rely on Economy Pumps.

Centrifugal, axial, and mixed flow pumps for all applications.

For complete details on any Economy Pump, write Dept. M-3 Please specify type pump in which you are interested.

**Economy Pumps, Inc.**

Division of Hamilton-Thomas Corp.  
HAMILTON, OHIO



**Klipfel**

MANUFACTURING COMPANY

DIVISION OF HAMILTON-THOMAS CORP.  
HAMILTON, OHIO

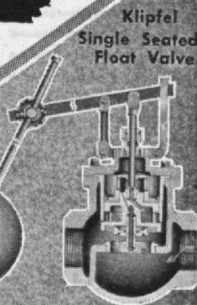
For complete details on any Klipfel Valve, write Dept. M-3 Please specify type valve in which you are interested.

**ACCURATE, DEPENDABLE REGULATION**

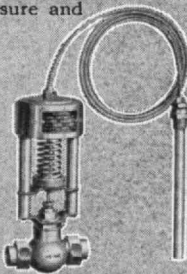
**CLOSER REGULATION** . . . more accurate control . . . that's been the forty year service record of Klipfel Automatic Regulating Valves on installations throughout the land.

Klipfel exclusive design inner valves assure better closing, more dependable regulation.

Complete line includes pressure reducing valves, float and lever valves, thermostatic valves, back pressure and relief valves and pump governors.



Klipfel Single Seated Float Valve



Klipfel Spring Loaded Thermostat



Klipfel Ball Type Reducing Valve



**Glad to hear it!**



Grateful thanks from us station attendants to those automotive engineers who have made the VENTALARM\* Whistling Tank Fill Signal standard equipment. In 1950 over a million cars will be equipped.

It is the only method that protects against all three types of spillage:

1. Blowback
2. Overfilling
3. Expansion spillage due to temperature change.

*"Fill till the whistle stops."*

A great saving of time, temper, car finish and gasoline.

\* Reg. U.S. Pat. Off.

Manufactured by

**SCULLY SIGNAL COMPANY**

70A First Street, Cambridge 41, Mass.

## THE INSTITUTE GAZETTE

(Continued from page 171)

In the afternoon on December 3, the varsity and freshman swimming meet with Brown took place. Brown's varsity team won the meet, 40 to 35, with the freshmen ending in a 37 to 37 tie. A rifle match with Harvard resulted in a 1,389- to 1,310-point victory for Technology's varsity team, and a 872 to 842 score in favor of M.I.T. freshmen. Other afternoon events included: a varsity squash match with Dartmouth, with an 8 to 3 defeat for M.I.T.; a wrestling match with Tufts, with a 22 to 13 win for the Institute's varsity team; and a demonstration by Technology swordsmen. The week end concluded with a Harvard-won hockey game.

KENMORE 6-2595

**LOUIS K. FRANK CO.**

*Advertising*

132 NEWBURY STREET

BOSTON 16, MASSACHUSETTS

LOUIS K. FRANK '34



**CO<sub>2</sub>**

**GAS . . . LIQUID . . . SOLID (Dry Ice)**

**THE LIQUID CARBONIC CORPORATION**

3100 South Kedzie Avenue, Chicago 23, Illinois

**U. S. A.**

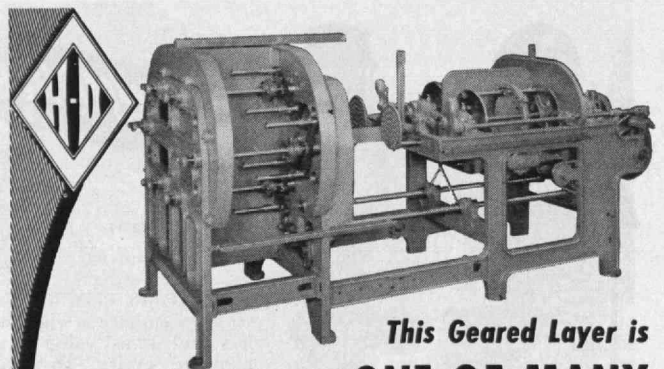
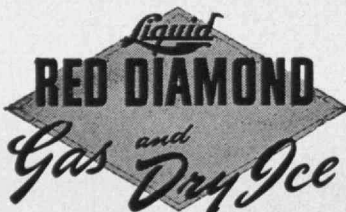
28 Producing Plants  
More than 50 Distributing Points

**CANADA**

Halifax to Vancouver

**OVERSEAS**

England, Cuba, Mexico, Venezuela,  
Colombia, Trinidad, Brazil



*This Geared Layer is*

**ONE OF MANY**

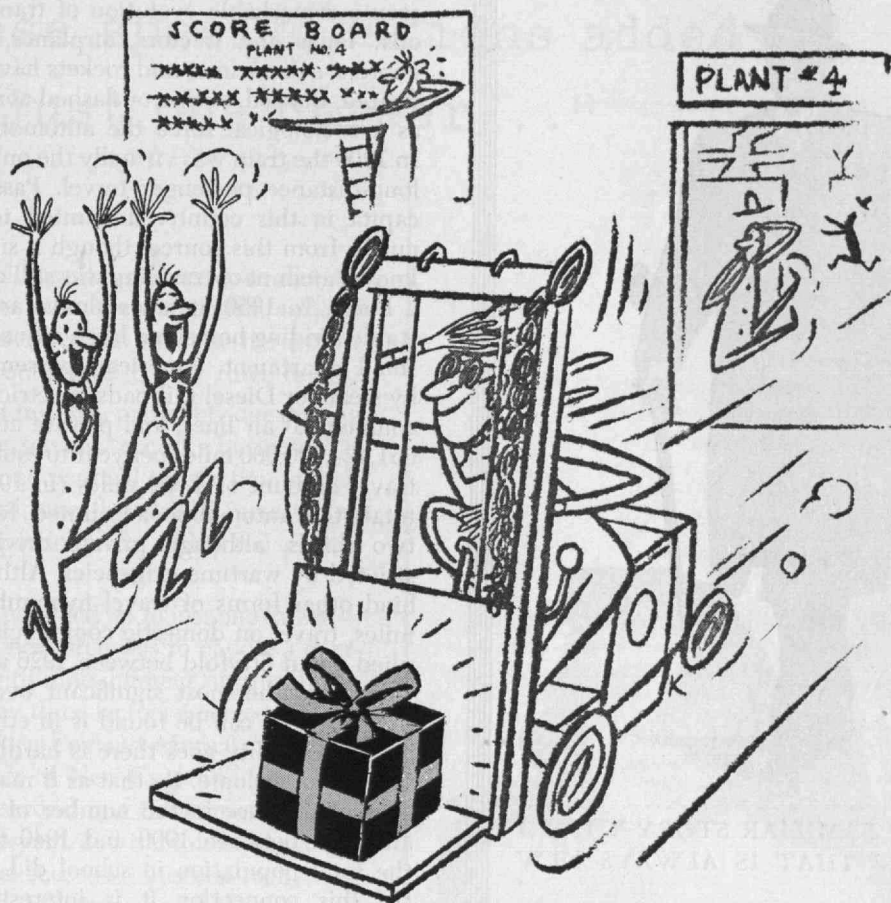
**SPECIALIZED H-D MACHINES**

**FOR THE ROPE, TWINE & ALLIED INDUSTRIES**

• It produces a balanced construction of various plies of yarn-strands or wire-bunches. Built in many sizes, and adaptable to various numbers of plies, finished diameters and lengths of finished work. • Haskell-Dawes machines for the twisting and laying of yarns, cords and rope reflect over eighty years specialized experience. Whether you process jute, hemp, flax, asbestos, manila, cotton, synthetics, wire or paper, Haskell-Dawes machinery can help you increase production, improve quality, lower costs. Write today to Dept. T-3 for technical bulletins.

**HASKELL-DAWES**  
**MACHINE COMPANY, Inc.**

2231 E. Ontario Street  
PHILADELPHIA 34, PA.



## HOW TO GET YOUR NEW PRODUCT

# *Rolling in a Hurry!*

**BEST WAY...** is to let Taft-Peirce help you over the hump. Here you'll get the fast tempo you want on designing... tooling... even manufacturing, if you like. And this is important... you'll get the fresh point of view of engineers and production men, experienced in similar problems for hundreds of other companies. This may well result in valuable improvements in your product... in faster, more efficient production... in lower costs.

**WE'LL DESIGN IT...** Start from scratch with a basic idea. Or **REDESIGN IT...** from your present models in cooperation with your engineers.

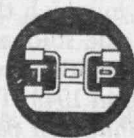
**BUILD YOUR PILOT MODELS...** Carry the project right up

through the pilot model stage. Test it under gruelling conditions to give you a working prototype.

**HANDLE THE TOOLING...** Design and build the entire tool program. Deliver everything to your plant ready for your production line changeover. No reworking of tools on your part, either.

**PRODUCE IN QUANTITY...** If your plant can't, or doesn't want to, handle the job, we'll produce for you as long as you wish—in small lots or by the carload.

Write for our 82 page illustrated Contract Service Booklet: "Take It To Taft-Peirce." The Taft-Peirce Manufacturing Company, Woonsocket, R.I.



For Engineering, Tooling, Contract Manufacturing

**TAKE IT TO TAFT-PEIRCE**

## TWENTIETH CENTURY MID-POINT

(Continued from page 157)

America. The first half of the Twentieth Century has seen a remarkable evolution of transportation methods: tanks and tractors, airplanes, Zeppelins, helicopters, submarines, and rockets have crawled, flown, floated, buzzed, swam, or flashed across its stage. But as a sociological force the automobile has no peer. In 1900 the train was virtually the only rapid means of long-distance passenger travel. Passenger miles per capita in this country amounted to about 210 annually from this source, though a significant but unknown amount of traveling was still done on or behind a horse. In 1950, it takes almost as much money to stable a riding horse in a large city as it does to rent a small apartment. American passengers now travel, by steam or Diesel railroads, electric railways, busses, commercial air lines, and private automobiles, about 651,424,000,000 miles per year to establish a per capita travel account of 4,650 miles (in 1945). Of this 1945 total, the automobile accounted for almost exactly two thirds, although private driving was still restricted by wartime exigencies. Although still far behind other forms of travel in number of passenger-miles, travel on domestic commercial air lines multiplied about fiftyfold between 1926 and 1945.

Perhaps the most significant over-all measure of progress that can be found is in education, although as far as quality goes there is hardly a more difficult subject to evaluate. Be that as it may, there has been a great increase in the number of college students, although between 1900 and 1940 the percentage of the total population in school did not greatly alter. (In this connection it is interesting to speculate whether the increase in the span of life has not been one of the factors that has encouraged and justified longer periods of education for our young men and women.) In any case, the enrollment in institutions of higher learning grew from 237,590 in 1900 to 2,338,000 in 1947, almost a tenfold increase for a population that increased by 97 per cent during the same period. As for technical education, the number of engineers in this country in 1890 was 27,000. Today it is over 350,000, to which total M.I.T. has contributed about 40,000 Alumni. In the 1900's the colleges were graduating a few thousand engineers annually. Current postwar graduating classes are in the neighborhood of 30,000 to 40,000 per year, and a steady flow of perhaps 20,000 per year is expected when enrollment stabilizes.

In the field of technical education, it is interesting to recall the growth of M.I.T. during the last five decades. In 1900, there were 1,178 students and an active teaching staff of 172, representing an average of 6.9 students per instructor. In 1949, the student body had increased to 5,433, and the teaching staff to 747, with an average of 7.2 students per staff member. Thus, it is clear that the extent of individual attention which the M.I.T. student received did not suffer in the period in which there was more than a fourfold increase in the student body. On the financial side, Institute operations were \$356,000 in 1900, as against \$7,000,000 in 1949. Tuition fees during the

(Continued on page 176)



### AN OLD AND FAMILIAR STORY WITH A SIGNIFICANCE THAT IS ALWAYS NEW

We hope that you will pardon us if you have heard this story before . . . but we can never tell it too often:

As Makers-and-Merchants-in-one, we buy our own woollens direct from the finest mills in America, England and Scotland.

We cut Rogers Peet Clothes on the patterns of our own Master-Designer. We hand-tailor them to the highest standard in the industry, in our own workrooms. We sell them direct over our own label.

Every superiority we put into them, every advantage you gain at every step of the way, adds up to the Style-Distinction, Lasting Workmanship, and Outstanding Value so characteristic of Rogers Peet.

*Makers-and-Merchants-in-one since 1874.*

*Rogers Peet  
Company*  
*Makers of fine clothes*

In New York:  
Fifth Avenue  
at 41st Street

Thirteenth St.  
at Broadway

Warren Street  
at Broadway

And in Boston:  
Tremont St.  
at Bromfield St.



## "These specifications added up to just one career..."

I WENT from the University of Tennessee directly into the Army. And after the war ended, a lot of serious thinking convinced me that the life work I wanted to follow would have to offer three things:

First, a business of my own, preferably one dealing with people I'd enjoy serving; second, a business that would provide genuine personal satisfaction as well as a living, and third, one that would increase my income in direct proportion to my ability and willingness to work.

These specifications added up to just one career — life insurance. The next step was to choose a company. So I talked with nine different organizations, and out of this survey three factors emerged to help me decide on the New England Mutual. The first factor was the caliber of New England's men here in Memphis. The second was the company's outstanding training program, and the third, the recommendations of several successful business men.

So, in February, 1946, I joined New England Mutual. During my first year I completed two exacting training courses and sold a creditable volume of life insurance. Trips to company meetings introduced me to the company's friendly and able nationwide organization, increased my proficiency, and added greatly to the enjoyment I get out of my work.

Now, thanks to the knowledge of the business I have acquired, I am getting solid satisfaction out of serving a steadily growing clientele, and am earning considerably more than I could have earned elsewhere on a salary.

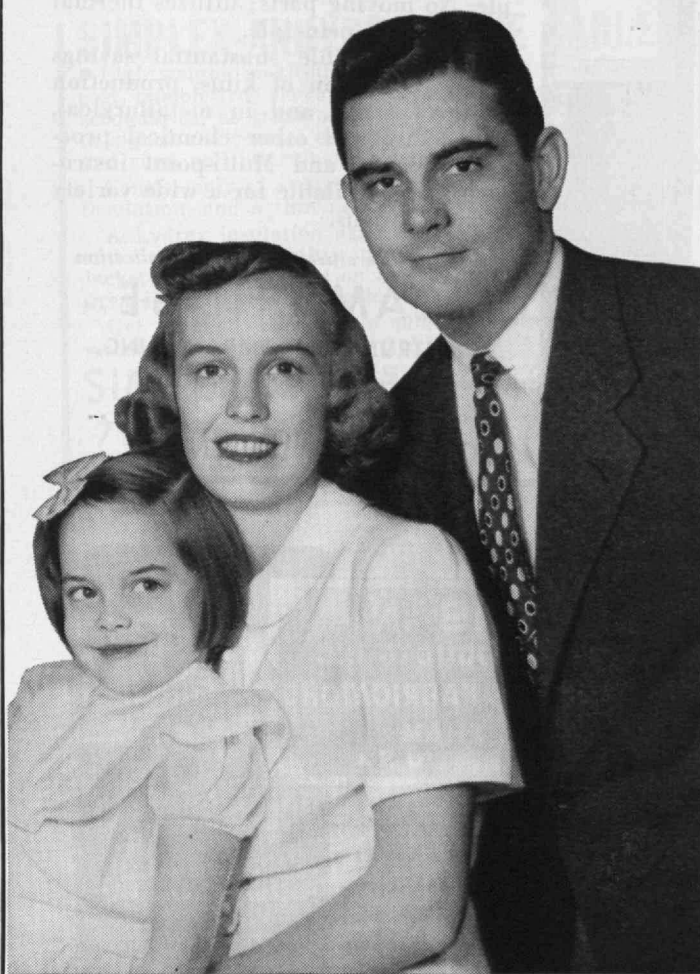
*John Phillips*

Recent graduates of our Home Office training course, although new to the life insurance business, earn average first-year commissions of \$3600 — which, with renewal commissions added, brings the total yearly income average to \$5700. From here, incomes rise in direct proportion to each individual's ability and industry.

If you'd like information about a career that gives you a business of your own, with no slow climb up a seniority ladder and no ceiling on earnings, write Mr. H. C. Chaney, Director of Agencies, 501 Boylston Street, Boston 17, Mass.

THE NEW ENGLAND MUTUAL LIFE INSURANCE COMPANY

JANUARY, 1950

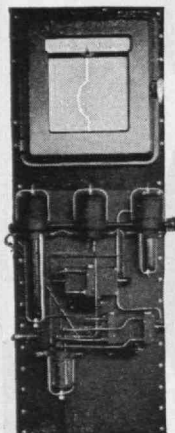
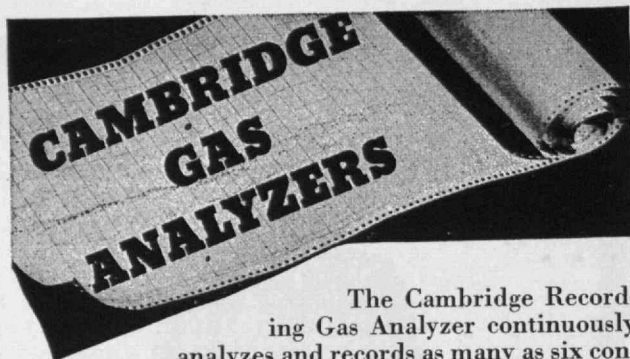


John Phillips III and family, Memphis, Tenn.

These Massachusetts Institute of Technology men are New England Mutual representatives:

Raymond P. Miller, '18, Salem  
Arthur C. Kenison, '19, Boston  
Blaylock Atherton, '24, Nashua

They can give you expert counsel on "Living Insurance" — a uniquely liberal and flexible life insurance program tailored to fit your family's needs.



The Cambridge Recording Gas Analyzer continuously analyzes and records as many as six constituents of a gas. Eliminates intermittent, slow and expensive manual gas analysis. Accurate . . . Sensitive . . . Simple. No moving parts; utilizes thermal conductivity principle.

Makes possible substantial savings in the operation of kilns, production of inert gases, and in metallurgical, petroleum, and other chemical processes. Single- and Multi-point instruments are available for a wide variety of applications.

Send for literature mentioning application

**CAMBRIDGE**

**INSTRUMENT COMPANY, INC.**

3707 Grand Central Terminal, New York 17

*Pioneer Manufacturers of*

**PRECISION INSTRUMENTS**

## TWENTIETH CENTURY MID-POINT

(Continued from page 174)

same period increased from \$200 to \$700 (and now stand at \$800) per year, but in no year in the Institute's history has tuition covered the average operating expense per student, which figure stood at \$301 in 1900 and almost \$1,300 in 1949.

In all of the above there has been little direct mention of the sciences, the source from which most of these trends and accomplishments have been derived, and which is now determining the shape of our material well-being for the next 50 years and more. Only the future will be able to judge the most significant findings of the last 50 years of science. It may very well be the discovery of the gene, or the rise of the large digital computers, or some far more obscure theory or happening. But there is no escaping the fact that, in the public mind, the dominating science today is nuclear physics. Chemistry might have held that honor prior to World War I, and astronomy still earlier. However, the concrete and blasting evidence of the atomic bomb, that the unbelievable theories and incredible findings of the atomic physicists were true, has given that field the funds and stimulus to undertake the most gigantic building program that science has ever seen. Physics, long accustomed to working with the most massive equipment of any science except astronomy, is now its own expanding universe. To a population that has just dimly begun to comprehend what a cyclotron is and does, comes the news that physicists are building, or have completed, among other similar items, a 300,000,000 electron-volt betatron, a 300,000,000 electron-volt synchrotron, and a 1,400,000,000 electron-volt bevatron. All are "atom smashers," or more specifically, means for accelerating various ultimate particles of matter to very high speeds so that they may become tools for exploring the nuclei of atoms and for creating, destroying, and manipulating their components. (Many of these devices owe their extraordinary accelerating abilities to the use of huge accurately timed pulses of high-frequency energy, a technique that was developed by the wartime need for long-range radars.

One could go on at length about Twentieth-Century inventions in weapons, poison gases, extraordinary sensing devices, such as radar, sonar, and infrared detectors, proximity fuses, jet and rocket propulsion, and so on. Along with their vast implications for death and evil are a few other facts selected at random. Radar equipment, whose genesis helped in creating our present particle accelerators — which in turn may lead to bigger atom bombs or an inexhaustible source of power for the good of mankind — is also being used on merchant ships and tugboats to hurry the flow of commerce, and several are pointed at the heavens, studying the real music of the spheres and collecting new data on meteors. Radioactive isotopes from the reactors of the Atomic Energy Commission are being shipped in such large lots into so many different industries and laboratories that the technical, and even the news, press is beginning to bristle with articles on their use and handling. In at least one important field, that of biochemistry, these easily traceable elements have been called the

**ARTISAN  
METAL PRODUCTS INC  
EQUIPMENT FABRICATORS  
WALTHAM  
MASS U S A**

THE HALLMARK  
of  
SUPERIOR  
EQUIPMENT

Artisan engineers and workmen are skilled in the techniques of metal working. Their combined knowledge and experience in engineering and building special equipment and machinery have been of value to many leading mechanical and process industries.

Write for a copy of "Process Equipment". For a qualified engineer to call to discuss your equipment requirements, telephone Waltham 5-6800 or write to: — James Donovan, '28, General Manager.

AUTOClaves  
CONDENSERS AND  
HEAT EXCHANGERS  
DISTILLATION  
EQUIPMENT  
EXPERIMENTAL  
EQUIPMENT  
EVAPORATORS  
MIXERS  
JACKETED KETTLES  
PIPE, PIPE COILS,  
AND BENDS  
REACTORS  
SPECIAL MACHINERY  
TANKS

**Artisan** METAL PRODUCTS, INC.

73 POND STREET, WALTHAM, (Boston 54) Mass.



most useful tool available to the investigators. Another science, meteorology, which even more than biochemistry has good cause to identify itself almost exclusively with the past 50 years, has found the long-range artillery rocket, currently in the shape of the German V-2, a useful instrument in exploring the upper atmosphere — a region about which information has been growing rapidly since the invention of radio. The 1947 Nobel prize for physics, incidentally, was awarded to Sir Edward V. Appleton for his work on the ionized layers lying above the stratosphere, although the possibility of such a layer was recognized by another Englishman, Oliver Heaviside, in 1902.

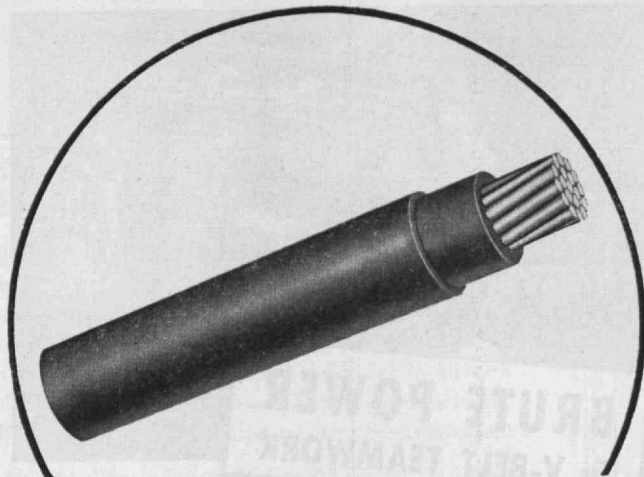
But to turn from this digression, Hideki Yukawa last year also became a Nobel prize winner, for the prediction, made three years before its confirmation as the result of cosmic-ray studies, that there must exist a particle of matter known as a meson. This incident recalls a nearly parallel affair that began when Rutherford in 1920 predicted the existence of the neutron, a particle that was discovered, also from cosmic-ray investigations in 1932. Is the shortened time scale of the later event significant of a faster pace in nuclear research?

These two brilliant predictions bring to mind a similar achievement of the human intellect that stirred the Nineteenth Century, and caused many to call it the most distinguished scientific triumph of that period. By calculations based on the slight perturbations of the planet Uranus, John Couch Adams deduced, about 1845, that there must exist beyond that orbit another planet. A year later Leverrier independently came to the same conclusion. He sent his findings to a German astronomer, who, within 30 minutes, found the planet Neptune. Yet, for all its brilliance, this accomplishment was overshadowed in fundamental importance by Darwin's statement of the theory of evolution.

For all its brilliance, has Twentieth-Century science yet produced a concept of comparable significance?

Perhaps it already has. In this period have been developed Einstein's theory of relativity, Planck's quantum theory, the conceptions of such men as Bohr, de Broglie, Dirac, and Rabi. With his first differential analyzer, Vannevar Bush, '16, opened the modern era in automatic calculating machines, with the present digital computers and their memory circuits beginning to suggest the possibility of approaching the human mind in complexity and power. Possibly the development of huge research organizations and techniques which are able to bring teams of highly trained specialists together to solve a given problem may be the outstanding achievement of the past half century. Or is it the biological discoveries associated with the name of Thomas Hunt Morgan — the knowledge gathered about the actual mechanism of heredity — that will prove in the end to be the most powerful force yet unleashed on mankind? The last few decades have opened entire new chapters in medicine and in the knowledge of the chemistry of life. The secretions of the various body glands have been studied and applied in startling fashion. Purified, and even synthetic, vitamins have come into general use. Chemical drugs of miraculous powers, the sulfanilamides, have ap-

(Concluded on page 178)



## SIMPLEX-ANHYDROPRENE CABLES

• Lightweight, small-diameter cables that promise low-cost, trouble-free service as underground primaries and secondaries, as transformer leads and pole line risers, in signal and control circuits, and when used for plant and shop and instrument wiring.

Consist only of a coated copper conductor, Anhydrex insulation, and a thin neoprene jacket.

Anhydrex insulation assures high dielectric strength and exceptional stability in wet locations. The neoprene jacket provides protection against rough handling, oil, grease, corrosive chemicals, light, heat and flame.

Get detailed information plus specification data by writing today for Bulletin 115.

## SIMPLEX WIRE & CABLE CO.

79 Sidney St., Cambridge 39, Mass.



Reg. U. S. Pat. Off.

## Samson Cordage Works

Boston 10, Mass.

Manufacturers of braided cords of all kinds, including sash cord, clothes line, trolley cord, signal cord, shade cord, Venetian blind cord, awning lines, etc., also polished cotton twines and specialties.

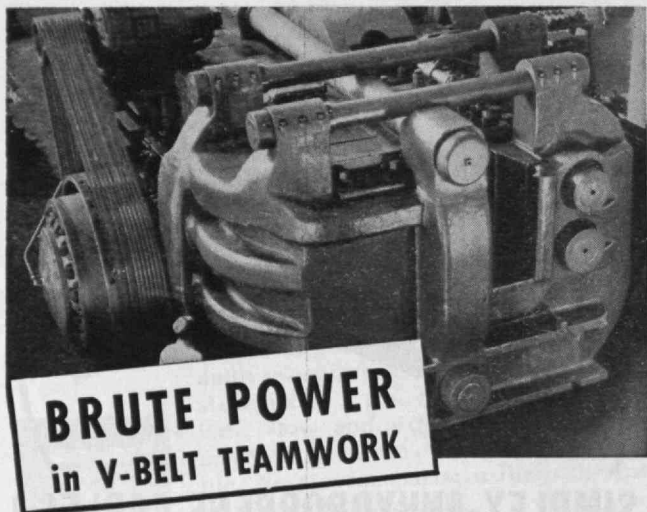
## SPOT CORD

Reg. U. S. Pat. Off.



Our extra quality sash cord, distinguished at a glance by our trade-mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than half a century.





with *Condor* Whipcord V-Belts

Manhattan pre-stretches the continuous wound Whipcord strength member during the manufacture of Condor Whipcord V-Belts. This reduces inelastic stretching on the drive to a minimum. Therefore, every belt remains taut and pulls its share of the load. Whether your drive uses 2 belts or 22, you can depend on good V-Belt *teamwork* with Condor Whipcord V-Belts.

Manhattan also manufactures Non-Spark and Oil-Proof V-Belts. Bulletin 6868-B gives you more details. Send for your copy now.



**RAYBESTOS-MANHATTAN INC.**

*Keep Ahead with Manhattan*

MANHATTAN RUBBER DIVISION • PASSAIC, NEW JERSEY

## TWENTIETH CENTURY MID-POINT

(Continued from page 177)

peared, to be followed immediately by still more miraculous antibiotics, such as penicillin and streptomycin. There is no more precious possession, no more valuable resource, than life itself, and in these past five decades nearly a score of years have been added to the span of the average individual's existence.

To every name and achievement that have been listed in these few thousand words, the reader can add his own, and probably better justified, selections. It could not be the aim in such a brief discussion to do more than suggest the richness and variety of this period. Wallace, who with Darwin, was first to glimpse the framework of evolution, called the years between 1800 and 1900 the "wonderful century." The pace, since then, has much more than doubled, and the effects continue to spill over into the realms of economics, sociology, and history. Science is part of that party to which Victor Hugo belonged and which he described in autograph on a wall of the room in which he died, in terms that have been hammered home by two bitter World Wars, as

... a party which does not yet exist:  
the party of revolution, civilization.  
This party will make the twentieth century.  
There will issue from it first  
the United States of Europe, then  
the United States of the World.

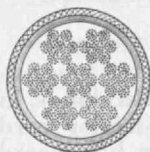
# B.I.W.

"TEFLEX"

## HIGH TEMPERATURE MOTOR AND TRANSFORMER LEAD CABLES

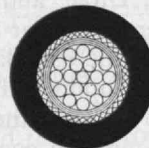
PATENTED

Designed to meet the requirements of electrical equipment operating at high temperatures — a flexible cable of higher dielectric strength and insulation resistance, smaller in diameter, flameproof, resistant to corrosive vapors, acids, and solvents. B.I.W. Teflex cables fill the need for high temperature cables operating in wet locations and severe conditions. They are made in two standard types.



BIW TYPE PFCV consists of flexible copper conductor insulated with a laminated layer of Dupont Teflon sealed with silicone to form a moisture-proof insulation which remains flexible after exposure to high processing temperatures and may be operated at 150°C continuously. Covered with a unique heat and abrasion resistant braid.

BIW TYPE PFRW similar to PFCV except that it has an external synthetic rubber sheath to provide more durability for heavy duty applications. This sheath will withstand varnish dipping and oven or infra-red baking. This type can be rated at higher temperatures and can carry higher power ratings than conventional cables.



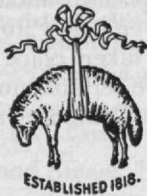
Both types are made in all sizes from #22 to #2 AWG in 600 volt rating and in high voltage ratings as may be required from 1,000 to 50,000 volts.

TYPE NO.	O.D.	Conductor	Voltage Rating	Current Rating	O.D.	TYPE NO.
PFCV-600-22	.080"	#22 7 stds.	600	5 Amps.	.120"	PFRW-600-22
PFCV-600-20	.090"	#20 7	600	8	.130"	PFRW-600-20
PFCV-600-18	.100"	#18 16	600	12	.145"	PFRW-600-18
PFCV-600-16	.110"	#16 19	600	20	.170"	PFRW-600-16
PFCV-600-14	.120"	#14 19	600	40	.185"	PFRW-600-14
PFCV-600-12	.140"	#12 19	600	55	.200"	PFRW-600-12
PFCV-600-10	.170"	#10 37	600	75	.270"	PFRW-600-10
PFCV-600-8	.220"	#8 133	600	100	.350"	PFRW-600-8
PFCV-600-6	.260"	#6 133	600	135	.390"	PFRW-600-6
PFCV-600-4	.320"	#4 133	600	180	.480"	PFRW-600-4
PFCV-600-2	.390"	#2 133	600	240	.550"	PFRW-600-2
PFCV-2500-20	.125"	#20 7	2500	5	.180"	PFRW-2500-20
PFCV-13000-14	.220"	#14 41	13000	30	.300"	PFRW-13000-14
PFCV-5000-12	.210"	#12 19	5000	50	.340"	PFRW-5000-12

BOSTON INSULATED WIRE AND CABLE CO.

Boston 25, Massachusetts

**THE MAJOR DIFFERENCE BETWEEN  
ONE TYPE OF CLOTHING AND ANOTHER  
IS NOT PRICE...IT'S TASTE**



One great advantage of ready-made clothing in America is that good clothing can be bought at many price levels. Here at Brooks Brothers, you will find our ready-made suits are available on our Second and Sixth Floors... each one representing the best price value that we know of.

There is one major difference, however, which has nothing to do with price. It is correct, casual good taste which is found here at all price levels. Over the years Brooks Brothers' manner of dressing has never been surpassed.

*Men's Ready-Made Suits, \$95 to \$115*

*Sixth Floor Shop Suits, \$65 to \$90*

*Brooks Brothers,*  
**CLOTHING,**  
*Men's Furnishings, Hats & Shoes*

46 NEWBURY STREET,  
BOSTON 16, MASS.

727 WEST SEVENTH ST.,  
LOS ANGELES 14, CALIF.

165 POST STREET,  
SAN FRANCISCO 8, CALIF.

346 MADISON AVENUE, COR. 44TH ST., NEW YORK 17, N.Y.  
111 BROADWAY, NEW YORK 6, N. Y.

# HAROLD J. RYAN, INC.

## *Air Conditioning*

101 PARK AVENUE

NEW YORK 17, N. Y.



FLIGHT TEST AND CONTROL INSTRUMENTATION  
GYROSCOPICS—ELECTRONICS—SERVOMECHANISMS

DESIGN • DEVELOPMENT • PRODUCTION

56 ELMWOOD STREET, NEWTON 58,  
MASSACHUSETTS

# A Report TO M.I.T. MEN

In 1917 Walker Memorial Building was opened, a gift from Alumni for the welfare of M.I.T. students. In addition to including offices for student activities and serving as a student social center, this building houses the dining service.

In 1948-49 nearly one million meals were served to staff and students. Morss Hall seats approximately 500 people. Thus, each chair served 2,000 people per year or 5.5 persons per day. We thank the Alumni for making these services possible.

## WALKER MEMORIAL DINING SERVICE

• M.I.T. •

CAMBRIDGE 39, MASSACHUSETTS

A. W. BRIDGES, Manager

## THE FASTEST TRAINS

(Continued from page 155)

averages of over 60 miles an hour between major terminals — by an extra-fare train in each direction on each run daily, except on Sundays and holidays.\* Their averages are given below, together with figures illustrating what has taken place since 1930 in the scheduled speeds of the certain famous French-named limiteds, such as the *Golden Arrow* and the *Blue Train*:

Paris to:	Miles	Train	Average miles an hour		
			1949	1939	1930
Calais	186	<i>Flèche d'Or</i>	58.1	58.1	58.1
Brussels	194	<i>Étoile du Nord</i>	51.1	63.5	55.2
		<i>L'Oiseau Bleu</i>	47.3	64.0	—
Lyon	318	Nos. 41 and 42†	62.4	—	—
		<i>Calais-Méditerranée</i>	45.4	52.2	42.7
		<i>Express (Train Bleu)</i>	44.8	56.8	47.9
		<i>Côte d'Azur</i>	60.2	—	—
Bordeaux	361	Nos. 7 and 8	53.1	64.0	46.8
		<i>Sud Express</i>	53.1	64.0	46.8
		<i>Pyrénées Côte d'Argent</i>	53.1	63.5	—
		Nos. 33 and 34	51.5	—	—
Marseilles	536	<i>Calais-Méditerranée</i>	46.3	53.1	43.8
		<i>Express (Train Bleu)</i>	46.3	58.3	49.0
		<i>Côte d'Azur</i>	46.3	58.3	49.0

† Advertised as "les plus rapides d'Europe" in 1949.

## Required Customs Stops

The above figures include those for one international service, that between Paris and Brussels, the running times of which are not materially affected by customs delays; in fact, the 1939 and 1930 trains listed ran nonstop between the two capitals. On most other European international runs, however, over-all averages are seriously reduced by required customs stoppages. The southbound *Rome Express*, for example, is now delayed 1.6 hours at Modane, else its Paris-Rome average would be 37.4 instead of 35.1; and *Sud Express* would now average northbound 39.2 instead of 34.9 from Madrid to Paris, were it not for a total of 2.8 hours lost at Irún and Hendaye. In the data which

(Concluded on page 182)

\* In 1939 there were three French runs at over 70 miles an hour, on all of which the fastest 1949 trains are booked in the 50's, viz.: Paris-Longueau, then 75.7 and now 56.5; Dijon-La Roche, then 74.2 and now 50.3; Nancy-Paris, then 73.0, and now 56.9.

## PIPE FABRICATING —SPECIALISTS—

for Oil, Chemical, Concrete, Asphalt  
and other Industrial Requirements

Butt Welds • Bending (all types) • Coiling  
Machining (inside and outside) • Cutting  
Threading • Beveling • Lining • Pickling  
Galvanizing • Sand Blasting • Preheating  
Heat Treating • Stress Relieving • Testing

to meet the most exacting specifications  
with absolute satisfaction

Fabricating Division

**ALBERT PIPE SUPPLY CO. INC.**

BERRY at NORTH 13th STREETS  
BROOKLYN 11, N. Y.

Phone: EVergreen 7-8100

## LEONARD CONSTRUCTION COMPANY

Engineers and Contractors

SINCE 1905

IN THE AMERICAS AND FAR EAST

37 South Wabash Ave.

Chicago



## J. C. CORRIGAN CO., INC.

### *Conveyers*

Engineers • Manufacturers • Erectors  
Coal Handling Systems  
Materials Handling Equipment  
Portable Conveyers

*Distributors for*

Jeffrey Manufacturing Co.  
Jeffrey Parts Carried in Boston Stock

41 Norwood Street, Boston 22, Mass.  
Tel. GENEVA 6-0800



## PRECISION-GAUGED HAIRSPRINGS AND FINE ROLLED WIRE

### PRECISION PRODUCTS COMPANY

WALTHAM, MASSACHUSETTS

ROBERT I. BRADLEY, '20

## GEORGE W. McCREERY CO.

### *Building Construction*

126 NEWBURY STREET

BOSTON, MASS.

William H. Coburn, '11

William F. Dean, '17

## William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire St.

Boston, Mass.

# Lord Electric Company

INCORPORATED

1895

ELECTRICAL CONSTRUCTION

1950

131 Clarendon Street  
Boston 16, Massachusetts  
Telephone COMmonwealth 6-0456

10 Rockefeller Plaza  
New York 20, N. Y.  
Telephone CIRCLE 6-8000

1201 Plaza Building  
Pittsburgh 19, Pa.  
Telephone COURT 1920

# The TREDENNICK-BILLINGS CO.

## *Construction Managers*

K. W. RICHARDS '07

H. D. BILLINGS '10

10 HIGH STREET

## *Building Construction*

C. C. JONES '12

F. J. CONTI '34

BOSTON, MASSACHUSETTS

# WILLIAM D. NEUBERG CO., INC.

## Chemicals

GRAYBAR BUILDING 420 LEXINGTON AVE.

NEW YORK 17, N. Y.

TELEPHONE OREGON 9-2550

CABLE—"WILNEUBERG"

Plans  
Specifications  
Supervision

Reports  
Evaluations  
Consultation

## HOLMES & NARVER

INCORPORATED  
ENGINEERS

824 South Figueroa Street, Los Angeles 14

JAMES T. HOLMES  
M.I.T. '14

D. LEE NARVER  
Stanford '14

## N. A. LOUGEE & COMPANY

ENGINEERS

Successors to J. H. Manning & Company

Reports—Appraisals—Depreciation Studies

Rate Cases—Business and Economic Studies

120 BROADWAY

NEW YORK

N. A. LOUGEE '11

L. H. MATTHEWS '13

J. W. McDONALD, JR. '20

## SYSKA & HENNESSY, INC.

Engineers

Consultation

Plans

Reports

Power Plant

Water Systems

Disposal Plants

Air Conditioning Systems

NEW YORK, N.Y.

J. F. HENNESSY '24

## THE FASTEST TRAINS

(Continued from page 180)

follow, no 1949 Paris-Berlin average appears for *Nord Express* since its Berlin section is as yet in postwar operation only as far as Helmstedt:

Paris to:	Miles	Train	Average miles an hour		
			1949	1939	1930
Berlin	666	<i>Nord Express</i>	—	54.1	39.2
Rome	(via Modane)	<i>Rome Express</i>	35.1	43.1	35.5
Madrid	905	<i>Sud Express</i> <i>Pyrénées Côte</i> <i>d'Argent</i>	34.9	38.9	35.3
Bucharest	1,617	<i>Orient Express</i>	28.5	40.3	—
	1,660	<i>Arlberg Express</i>	28.9	39.9	35.1
Istanbul	1,884	<i>Simplon-Orient</i> <i>Express</i>	30.2	—	—
			22.7	34.0	31.7

## Frontier Delays

Most affected of all by intervening frontiers is the last named, for the route of the *Simplon-Orient* traverses the soil of seven different political entities—France, Switzerland, Italy, Trieste, Yugoslavia, Bulgaria, and Turkey. Besides the delays of six frontiers, the train remains stationary half a Bulgarian day at Sofia. Thus, its cited current average of 22.7 miles an hour westbound is largely an arithmetical measure of accomplishment against postwar interruptions by this hitherto glamorous train de luxe, favored in an elder day by innumerable rajahs, princes, millionaires, and lovely lady spies to whose exploits aboard allusions may be found in the writings of Agatha Christie, Eric Ambler, and the late E. Phillips Oppenheim, or in the films of portly Alfred Hitchcock.

## JAMES F. DOWNEY & STAFF

INDUSTRIAL ENGINEERS

WORK LOADS, JOB CLASSIFICATION,  
EQUIPMENT UTILIZATION,  
PLANT LAYOUT, PRODUCTION CONTROL  
LABOR RELATIONS

20 NORTH BROADWAY  
WHITE PLAINS, N. Y.

SOUTHERN OFFICE:  
GREENSBORO, N. C.

James F. Downey, '20

## PREPARATORY SCHOOLS FOR BOYS

### CHAUNCY HALL SCHOOL

Founded 1828. The School that specializes in the preparation  
of students for the Massachusetts Institute of Technology.

Ray D. Farnsworth, Principal 553 Boylston Street, Boston, Mass.

### HUNTINGTON SCHOOL FOR BOYS

Grades Nine to Twelve.  
Thorough preparation for entrance to M.I.T.  
and other technical schools.  
Regular and summer courses.  
William G. Wilkinson, Headmaster

320 Huntington Ave., Boston

Tel. Kenmore 1800

# PROFESSIONAL CARDS

## JACKSON & MORELAND

*Engineers and Consultants*

Design and Supervision of Construction  
Reports — Examinations — Appraisals  
Machine Design — Technical Publications

BOSTON

NEW YORK

## DRUMMEY-DUFFILL, INC.

*Architects—Engineers*

80 Boylston Street  
Boston 16, Mass.

WM. W. DRUMMEY, '16, B.S., M.A.,  
A.I.A.

HUGH P. DUFFILL, '20, S.B., S.M.,  
M., Am. Soc. C.E.

## EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

500 FIFTH AVENUE

NEW YORK 18, N. Y.

*Mechanical — Electrical — Sanitary  
Air Conditioning — Power — Process Layouts*

J. K. Campbell, M.I.T. '11

## STARKWEATHER ENGINEERING CO.

INCORPORATED

*Engineers and Contractors for Pumping Plants  
Boiler and Power Plants, Cooling Water  
and Heat Recovery Systems*

246 Walnut Street, Newtonville

BIGelow 8042

J. B. Starkweather, B.S. M.I.T. '21

## THE KULJIAN CORPORATION

1200 North Broad St., Philadelphia 21, Pa.

CONSULTANTS—ENGINEERS—CONSTRUCTORS

*Specialists in*

UTILITY, INDUSTRIAL, AND CHEMICAL FIELDS

*Offices in*

Washington, D.C.—St. Petersburg, Fla.—Rome, Italy  
Calcutta, India

H. A. KULJIAN, '19

A. H. KULJIAN, '48

## FABRIC RESEARCH LABORATORIES

INCORPORATED

*Research, Development and Consultation  
for Textile and Allied Industries*

665 Boylston Street

Boston, Mass.

W. J. HAMBURGER, '21

K. R. FOX, '40

E. R. KASWELL, '39

## GILBERT ASSOCIATES, INC.

ENGINEERS AND CONSULTANTS

Malcolm G. Davis '25, Vice President Allen W. Reid '12 E. C. Edgar '35

Steam, Hydro, Diesel Power Plants; Industrial Structures;  
Plant Safety, Labor Relations, Utility Rates, Valuations,  
Reports; Large Scale Purchasing; Industrial Laboratory

New York, N. Y.  
Philadelphia, Pa.

Reading, Pa.

Washington, D. C.  
Houston, Tex.

## FAY, SPOFFORD & THORNDIKE

*Engineers*

Airports — Bridges — Water Supply and Sewerage  
Port and Terminal Works — Fire Prevention

INVESTIGATIONS

DESIGNS

SUPERVISION OF CONSTRUCTION

Boston

New York

## CLEVERDON, VARNEY & PIKE

*Consulting Engineers*

HERBERT S. CLEVERDON '10

WALDO F. PIKE '15

Structural Designs

Foundations

Heating Ventilating and Plumbing Designs

Industrial Buildings, Reports, Investigations

120 TREMONT STREET

BOSTON 8, MASS.

## MAURICE A. REIDY

*Consulting Engineer*

BRIDGES

BUILDINGS

STRUCTURAL DESIGNS

FOUNDATIONS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

*Estimates and Appraisals*

101 TREMONT STREET

BOSTON, MASS.

## THE COSMA LABORATORIES CO.

1545 East 18th Street

Cleveland 14, Ohio

Chemical Analysis — Testing — Consulting Engineering  
Testimony and Research

H. SEYMOUR COLTON, M.I.T. '21  
Director

R. W. FRISCHMUTH, Case '32  
Assistant Director

## MORAN, PROCTOR, FREEMAN & MUESER

CONSULTING ENGINEERS

420 LEXINGTON AVENUE

NEW YORK 17, N. Y.

Foundations for Buildings, Bridges and Dams;  
Tunnels, Bulkheads, Marine Structures, Soil Studies and  
Tests; Reports, Design and Supervision

Pardo, Proctor, Freeman & Mueser  
Ingenieros Consultores  
Ap. Correos 614, Caracas, Venezuela

WILLIAM H. MUESER, '22

WILLIAM W. RUSSELL '22

EDGAR P. PALMER '25

## PALMER RUSSELL CO., Realtors

1320 Beacon Street

Brookline 46, Massachusetts

COMPLETE MORTGAGE SERVICE

Business Loans to Corporations and Institutions

Loan Correspondent for the Penn Mutual Life Insurance Company

FAirmount 5105

EXpress 7766

## FRANK MASSA

*Electro-Acoustic Consultant*

3393 Dellwood Road

3868 Carnegie Avenue

CLEVELAND, OHIO



# What GENERAL ELECTRIC People Are Saying

J. H. HOLLOMON,

*Research Laboratory*

**NUCLEATION:** Such diverse problems as the kinetics of phase transformations, the formation of cracks in solids or of bubbles in liquids, and the formation of reversed domains during demagnetization have been treated in terms of the concepts of nucleation and growth. By nucleation is meant the formation of a new and distinct region separated from its surroundings by a discrete boundary. Nucleation is involved in the formation of a small droplet of water from water vapor, the formation of a small region of body-centered cubic iron within a face-centered cubic matrix, and the formation of a region of ferromagnetic material having one-spin orientation in a matrix in which the orientation of the spins is different.

The problem of nucleation, then, is pertinent to some of the most interesting transformations occurring in nature, and by control of the rate of nucleation the transformations can be controlled. Recently, for example, it has become possible to modify the weather over large geographic regions by simply inducing the nucleation of ice from a cloud of water droplets. Recently also metals have been significantly supercooled by preventing the formation of nuclei over a wide range of temperatures.

*American Society for Metals,  
Cleveland,  
October 15, 1949*



A. H. SHARBAUGH,

*Research Laboratory*

**EXPLORING MOLECULES:** One of the outgrowths of the intensive research in the radar field during World War II has been the opening of a promising new field: that of exploring the molecule with radio waves . . . With a microwave spectrometer we cause radio waves about  $\frac{1}{2}$ -inch long to pass down a long hollow pipe which is filled with the gas we wish to study. At the far end we measure the radio power with a crystal detector and show the pattern on a television tube. Every time we tune the microwave source through an absorption line we see a sharp dip in the trace

on the oscilloscope or television tube. By tuning over the available frequency range, we find out experimentally all the frequencies where the energy is absorbed as well as how strongly it is absorbed.

One advantage that microwave spectroscopy holds over the kinds of spectroscopy practiced at shorter wavelengths, as in the region of visible light, is the ability of the microwaves to distinguish between absorption lines that are very close together. This quality, known as resolution, is several thousand times better than the best optical instruments . . .

By using a crystal oscillator checked with WMV, the Bureau of Standards station at Washington, D. C., we may generate standard reference markers throughout the frequency range of the spectrograph. By means of these we can measure experimentally our absorption lines to about 1 part in a million. Not quite all this accuracy is retained in the molecular geometry because of uncertainties in Planck's constant and the fact that the molecule may be slightly flexible and disturb our measured interatomic distances. In spite of these limitations, we may calculate from experimental data the distances between atoms to an accuracy of 1/1000 of an angstrom unit or 1/100 of a millionth of an inch!

The fact that these microwave absorption lines are extremely sharp and very stable opens up the avenue to some interesting applications. One of these is the use of the spectroscopy as an analytical tool for chemists. The frequency range currently used in microwave spectroscopy is from about  $\frac{1}{2}$  cm. to 2 cm. in wavelengths and, even in this relatively small region so far investigated, there is room for 5 million noninterfering rotational absorption lines. In principle, it is believed that a thousand or more different complex organic molecules could be determined from a sample weighing less than 1 ten-millionth of an ounce without harming it in

any way and without using up the sample . . .

Although microwave spectroscopy primarily yields information about the structure of the molecule as a whole, it may also be used for studying the rotation of internal groups of atoms within the molecule.

*General Electric Science Forum,  
WGY,*

*September 28, 1949*



C. G. SUITS,

*Vice President and Director of Research*

**ATOMIC POWER:** It is probable that about \$200 million will have to be spent in the process of building successive experimental power plants before we will have a proper basis for judging the future economic possibilities of atomic energy. Because of the great array of unanswered technical questions, there can be no assurance at present that the final result will be successful. If a profitable atomic industry ever develops, it is certainly decades in the future. This financial risk is obviously one which cannot be supported by any private capital in the world, so that it is clear from the outset that only the resources of the national government can sustain the required effort. Not only does the great cost of the development make it necessary for the national government to foot the bill, but the fact that fuel for atomic power plants is also the explosive material of atomic bombs makes it necessary for the federal government to control the security and accountability aspects of the project in great detail. All atomic energy work is thus the responsibility of the Atomic Energy Commission and is carried out in laboratories operated by its contractors.

*National Academy of Sciences,  
Rochester, N. Y.,  
October 25, 1949*

*You can put your confidence in—*

**GENERAL  ELECTRIC**

# WORLD WAR II MEMORIAL

Plans are being completed for a memorial to commemorate those M.I.T. Alumni who died in the service of the United States and its Allies during World War II. Through funds raised by the Class of 1921, the names of those who thus served their country are to appear on the north wall of the lobby of Building 10, in proximity to a similar memorial for casualties of World War I.

The names listed below include all World War II service casualties for which the M.I.T. Alumni Association has a record. The list is published in an effort to make the record as complete as is humanly possible. Review readers are urged to communicate with Donald P. Severance, Secretary of the Alumni Association, regarding the names of Alumni, not given below, who may be eligible for listing.

1904  
Bakewell, Joseph Hunter

1905  
Nicholson, Dow Hiram

1908  
Ferris, Raymond West  
Fretz, Paul Henry

1912  
Morrill, Carl Henry

1916  
DeMerritt, Robert Elwyn  
Harms, Henry William  
Hyde, James Francis Clark  
Newton, Burkett Dunlap  
Webster, Walter Wynne

1917  
Barry, Edwin Fry  
Conaty, Francis Sylvester  
O'Brien, Thomas Francis  
Robinson, Clark

1918  
McVickar, Lansing

1919  
MacKirdy, Howard Spencer  
Morrison, Robert Fletcher

1921  
Healy, Howard Raymond  
Lyon, Alfred Jefferson  
Newcomer, David Albert  
Raymond, Fred Luman  
Starck, Carl William

1922  
Gallagher, Ernest Francis

1923  
Englehart, Alva Franklin  
Fleming, Robert Walton  
Mullinnix, Henry Maston

1924  
Brimberg, Isaac  
Liqued, Charles Nelson  
Royal, Forrest Betton

1925  
Kane, John Dandridge Henley  
McGinnis, Francis William  
Mize, Charles Roderick  
Parkinson, Roger Wendell

1926  
Fine, Francis Gurney Jr.

1927  
Gerst, George Samuel  
McCarthy, Joseph Lynn  
Shisko, Alexander George

1928  
Estes, Norman Cornell  
Petrie, Malcolm Oliver

1929  
Houck, William Gabriel Jr.  
Jacob, Perry Hammond

1930  
Payson, Olcott Sprigg  
Peoples, Ulysses John Lincoln Jr.  
Williams, Randolph Piersol

1931  
Allen, William Irwin

1932  
Allee, Edward Schwartz  
Burr, Leland Mothershead Jr.  
Crockett, Otis Waite  
Parks, Gordon Keith

1933  
Carle, Earl Richards  
Case, Charles Vincent Jr.  
Harper, Thomas Jr.  
Latimer, William James  
Mitchell, Floyd Allen

1934  
Battit, Beshara Elian  
Castle, Robert Dix  
Emery, Robert Macnab  
Gibson, George Davis  
Hubbard, Harry Ensor  
Kelly, Erskine  
Parker, Frank Claveloux Jr.  
Steele, Justus Underwood

1935  
Bodell, Brandon Brewster  
Davies, Harold Francis Theophilus  
Dove, Paul Whitney  
Garner, Howard Robert  
Pagliuca, Salvatore  
Trescher, William  
Yepsen, William Grundtvig

1936  
Black, Francis Loudon  
Bosworth, Lawrence Arthur  
Gardiner, John Dick  
Gates, Clayton Samuel  
Knight, Edmund Clark  
Robinson, William Hurlin  
Steinhurst, William Arnold  
Waxman, Mark Murray Jr.  
Williams, Robert Erskine Jr.

1937  
Bartlett, David Bradt  
Breitling, George Thaddeus  
Clark, Lincoln Romeiser Jr.  
Cander, John Henry  
Haggerty, Robert Foster  
Kendzur, Max Simon  
Laus, Andre Nicol  
Strauten, Robert  
Walsh, Edward Clark  
Weschler, Charles John  
Wirtz, Elmer Clarence Jr.

1938  
Dionne, Arthur Louis  
Gallagher, Robert Anthony  
Guttel, John  
Lamb, Fred Lee  
Mills, Charles Robert  
Paige, Walter Hale Jr.  
Spengler, Daniel Stickley  
Thau, William  
Topalian, James Malcolm  
White, William Thomas

1939  
Clark, Sterling Moore  
Hall, Leigh Spaulding Jr.  
Jackson, John West  
McRoberts, Clare Arthur  
Merrill, Leonard Abbott Jr.  
Putnam, Henry Ware  
Scheidt, Frederick Emil

1940  
Bernd, Peter Paul  
Crimmins, Francis Joseph  
Downer, Delavan Bloodgood Jr.  
Ekeberg, John Clayton  
Fodale, Charles Benedict  
Hurley, Henry Wright  
Johnson, Malcolm Edward  
Little, Augustine Patterson Jr.  
Nash, Lloyd Williams  
Smith, George Rosse  
Stone, George Roben  
Teich, Lawrence Edward  
vanSchaick, John

1941  
Adelson, Horace Jonas  
Atwater, Charnley Kemper  
Bird, John Russell  
Campbell, Thomas Colin Jr.  
Cooke, James Henry  
Doughten, William Simpson Jr.  
Ferguson, James Hollister  
Heist, John Cameron  
Henry, Richard Kirk Jr.  
Jerome, Frank Jay III  
Logsdon, Thomas Mitchell  
Nagle, John Joseph III  
Reeves, Milton Clark  
Schaeffer, Richard Tague  
Seabury, Richard Hutchinson  
Shepard, William Milson  
Van Tuyl, Richard Albert  
Wade, Howard Winfield  
Whitman, Harry Gill Jr.  
Wiener, Richard Sampson

1942  
Augusterfer, Donald William  
Bardwell, Allan Ralph  
Baumann, Frederick William Jr.  
Costello, Francis Michael Jr.  
Downing, James Francis  
Dzenolet, Arthur  
Herman, Bradford Kent  
Jones, Cutler  
Kelley, Charles Francis Jr.  
Klopp, Harold James  
Kunz, Robert Calvin  
Leiserson, Charles Frederick  
McHarg, William Carmen  
McNall, Burt Chester  
Manders, Robert Emmett Jr.  
Pfueger, James Williams  
Reed, Harold MacGregor  
Root, John David  
Shepard, John Hamilton  
Shepard, Leonard Griffin  
Stamper, David Warren  
Traupe, William Frederick  
Young, James Howard Jr.

1943  
Bryan, Norman Robert (GWS)\*  
Davis, William LeRoy  
Fenton, Douglas Grant  
Fleming, Lamar III  
Graham, Everett John Jr.  
Immer, Edward Carpenter (GWS)  
Jenkins, Cornelius Allen  
McGrath, Thomas Edward  
Mank, Matthew  
Papp, Stephen Richard (GWS)  
Smith, Gustavus Hindman Miller

Spear, Ernest Mills  
Van Burgh, Lisle  
Weidman, Lloyd Edward (GWS)  
Wolf, Warren Frederick

1944  
Allen, Robert William  
Bresler, Richard Herbert  
Burke, James Cyril Jr.  
Burke, John Francis  
Carr, Theodore John (GWS)  
Connett, Harold Jr.  
Elrick, Richard Grant (GWS)  
Freund, Walter Joseph Jr.  
Grant, William Daniel  
Hann, Vincent Robert  
Herb, John William  
Hyde, William Benton  
Johnson, Robert Edward (GWS)  
Juliano, Louis William  
Kelley, James Edward  
Kinsman, Alfred Williams (GWS)  
McClave, James Seabury  
McKelvey, James Ruemmeli  
Nagy, Bertram Frank  
Nelson, Paul Gustaf  
Nightingale, William Edwin  
Parmelee, James Lovett  
Pohl, Julius Arnold (GWS)  
Pritchard, Elbert Baker  
Rowe, Llewellyn H. Jr.  
Schutte, George Arthur  
Seghers, Paul Dotreng Jr.  
Shepard, Henry Crawford  
Solow, Robert Julian  
Stowell, Mark (GWS)  
Vail, Derrick Tilton III

1945  
Anderson, Richard Neal (GWS)  
Appleton, James Henry (GWS)  
Brangan, William Francis Jr.  
Carr, Robert Sherwood  
Clement, Robert Carroll  
Curran, James Adams (GWS)  
Dixon, Robert Edward  
Eadington, Richard Daniel (GWS)  
Hallick, Edward Alexander  
Harris, Leon Francis  
Hunt, Donald Mulford  
Jackman, Waldo Clark Jr.  
Jacobson, Harold Wilsie (GWS)  
Klafstad, Erling Jr.  
Lisk, Norman Edgar Jr.  
Mack, Leon Meyer  
McMahon, Richard Paul (GWS)  
Morehouse, James Hollenbeck Jr.  
(GWS)  
Reeves, Willis Ward Jr.  
Robinson, William Rae  
Skinner, Charles Van Arsdale  
Stewart, Edward Forrest (GWS)  
Vestal, Charles  
Waldo, Duane Ralph (GWS)  
Wardwell, Theodore Maxwell Jr.

1946  
Baker, William Church  
Conlin, Joseph Anthony  
Horne, Frank William Jr.  
Johnson, Russell Willett  
Karno, Tobias Arthur Jr.  
Katcher, Stanley Julian  
Newbury, David Merwin  
Severson, Robert Duncan

\* GWS Government War Student ordered to M.I.T. during World War II in certain recognized training programs.

# Alumni AND Officers IN THE News

## We've Been Reading

RALPH T. WALKER'11 is the author of an article in the December, 1949, issue of the *Journal of The American Institute of Architects* entitled, "Public Relations." The article contains excerpts from an address given by Mr. Walker at a meeting of the Great Lakes section of the American Institute of Architects which was held this fall.

CRAWFORD H. GREENEWALT'22 is the author of an article, "Is Bigness Badness," which appeared in the October 10, 1949, issue of *Chemical and Engineering News*.

BERTRAM E. WARREN'23 and BENJAMIN L. AVERBACH'47 are the coauthors of "The Effect of Cold Work in Metals on Powder Pattern Intensities" which was published in the November, 1949, issue of the *Journal of Applied Physics*.

DAVID G. C. LUCK'27 has written *Frequency Modulated Radar*, a book published in November, 1949, by the McGraw-Hill Book Company, Inc.

MORRIS A. ADELMAN, staff, penned the article, "The Great A. & P. Muddle" for the December, 1949, issue of *Fortune*.

THOMAS H. D. MAHONEY, staff, and JOHN B. RAE, staff, are the coauthors of *The United States in World History*, one of the volumes in the McGraw-Hill Series in History. McGraw-Hill Book Company, Inc., 1949.

## Worth Noting

JEROME C. HUNSAKER'12 has been appointed by President Harry S. Truman to the National Advisory Committee for Aeronautics for a five-year term which will expire on December 1, 1954.

EGBERT C. HADLEY'14 became president of the corporation of Middlebury College, Middlebury, Vt., in November.

J. EARL FRAZIER'24 was elected to the presidency of the Pennsylvania Ceramics Association, Inc., for 1950 at a board of directors meeting held in November in Pittsburgh, Pa.

WILLIAM F. RIVERS'26 was one of the members of the United States delegation to the India-America Conference which was held at Delhi University from December 12 to December 22. The purpose of this conference was to promote mutual understanding and research on problems of common interest, including political, diplomatic, commercial and financial relations between India and the United States and to promote opportunities for developing cultural relations between them.

## Good for Them!

CHARLES B. BREED'97 was named as one of five honorary members of the American Society of Civil Engineers to be presented at the annual meeting of the Society which will be held in New York January 18 through January 20.

WILLIAM S. NEWELL'99 received a gold medal as a joint special award from the American Society of Naval Engineers and the Society of Naval Architects and Marine Engineers at the annual banquet of the latter society held on November 11, 1949. The medal was awarded for "illustrious and devoted service to his profession, his country, and his fellow-man."

WILLIAM H. MCADAMS'17 was presented with the William H. Walker Award on December 6, 1949, by the American Institute of Chemical Engineers. Professor McAdams was nominated as the award winner for his work in heat transfer. The award has been given since 1936 for distinctive contributions to chemical engineering literature.

DONALD F. WARNER'22 and his associates were cited for their contributions "to the progress of the jet engine industry in its early days by undertaking development under conditions of abnormal pressure." The citation was presented to Mr. Warner in behalf of the American Society of Mechanical Engineers at its 70th annual meeting held in November.

HAROLD G. ACKER'38 wrote a prizewinning technical paper entitled, "Highlights of Welded Ship Research" which was presented at the 57th annual meeting of the Society of Naval Architects and Marine Engineers in November. Mr. Acker was presented with the society's President's Award.

KARL T. COMPTON, Chairman of the Corporation, received the Colonel Thacher Nelson Award of the Advertising Club of Boston which is presented annually to the citizen of Greater Boston who has contributed most in the field of public service. The award for the year 1948-1949 was made to Dr. Compton in recognition of his long and distinguished career as physicist, educator and humanitarian, during which he has served his community and his country "in war and in peace, applying his great talents and selfless devotion in the service of his fellow-man." The award was presented at the club's luncheon meeting at the Hotel Statler on November 15 and was received for Dr. Compton by GEORGE R. HARRISON, Dean of Science at the Institute.

## Delivered at a Meeting of —

WILLARD F. ROCKWELL'08 addressed the Boston Advertising Club on December 13. Mr. Willard's subject was, "Strengthening Free Enterprise Through Advertising."

WALTER G. WHITMAN'17 presented a paper entitled, "Liquid-Fuel Supplies and National Security" during the 29th annual meeting of the American Petroleum Institute held in Chicago, Ill., in November, 1949. Mr. Whitman's paper was presented to a group session on "Fuels of the Future" under the auspices of the division of refining.

THOMAS K. SHERWOOD'24 was one of the speakers during the opening ceremonies and scientific conference of the University of Toronto's departments of Chemistry and Chemical Engineering held in December, 1949. Dr. Sherwood discussed, "The Relationships between Heat Transfer, Mass Transfer and Fluid Friction in Turbulent Flow."

LESLIE CORSA, JR., '41 spoke on "The Measurement of the Total Exchangeable Potassium in Man by Isotope Dilution" at the 35th clinical congress of the American College of Surgeons which took place in Chicago on October 20.

## Obituary

WILLIAM GODING'79, October 21.  
FRANCIS M. ADAMS'94, July 25.\*  
JOHN W. CHAPMAN, October 28.\*  
ARTHUR D. DEAN'95, November 20.\*  
CLEMENT B. TOWER'96, November 22.  
ALLEN W. JACKSON'97, November 4.\*  
DAVID D. CASSIDY'97, October 6.\*  
BENJAMIN S. HANNA'99, date unknown.\*  
ROSS HASBROUCK'99, September 30.  
DANIEL S. JOHNSON'00, September 9.\*  
ASHER L. WEIL'01, February 24.  
WALTER J. WELLMAN'02, November 13.  
FRANK B. JEWETT'03, November 18.  
ADDISON F. HOLMES'04, November 5.\*  
JOSEPH B. STEWART, JR., '08, November 10.  
ALTON L. DICKERMAN'09, October 27.\*  
THORNDIKE D. MARTIN'09, October 24.\*  
THOMAS F. MCLAUGHLIN'11, March 1.  
AARON L. MYERS'11, September 19.\*  
EDWARD D. VAN TASSEL, JR., '11, October 1.\*  
CHARLES L. GABRIEL'12, September 24.\*  
CHARLES T. GILLIARD'17, October 23.  
ALBERT C. SCHWEIZER'23, October 10.\*  
ROBERT P. EVERETT'24, date unknown.\*  
FRANCIS LE BARON'24, September 26.\*  
WALTER G. SCHARMANN'25, August 24.\*  
MORRIS MANDELBAUM, JR., '35, October 30.  
JOHN V. MANGET'41, July 3.  
DEAN M. FULLER, staff, November 23.

\* Mentioned in class notes.



# News FROM THE Clubs AND Classes

## CLUB NOTES

### *Atlanta Alumni Association of the M.I.T.*

The Association held its semiannual ladies night and baked bean dinner at the home of C. A. Smith '99 on November 19. The dinner was served in the true New England style and the attractive table decorations were unique; consisting of a series of red candles arranged in the letters, M.I.T. Our genial host made an excellent after-dinner speech, describing the 50th anniversary celebration and reunion of the Class of 1899, of which he is a member. Mr. Smith was re-elected president for the coming year by a unanimous vote. Mrs. Leon B. Locklin ('28) was re-elected business manager and official baked bean chef; a most important position, as her formula and technique for cooking Boston baked beans is unsurpassed for flavor, texture and succulency. Later in the evening, members and guests participated in old-fashioned square dancing and a most enjoyable evening was apparent.

Among those present were the following: Charles A. Smith '99, Lawrie H. Turner '99, Lowell Cady '17, Clifford S. Read '18, Douglas W. Coe '21, William E. Huger '22, Richard L. Gatewood '25, Roger W. Allen '27, Francis J. Guscio '27, Leon B. Locklin '28, George M. Seal '29, Carol M. Smith '32, Russell J. Brooke '33, and Erling Grovenstein, Jr. '48. Ladies present included: Mrs. Coe, Mrs. Gatewood, Mrs. Guscio, Mrs. Huger, Mrs. Locklin, Mrs. Read and Mrs. Seal. Other guests included: Miss Ruth Meadows, Mrs. A. F. Hess, Mrs. Jane W. Foote, and Mr. and Mrs. C. Frank Ridenhour. — LAWRIE H. TURNER '99, *Secretary*, 625 Sherwood Road, N.E., Atlanta, Ga.

### *M.I.T. Club of Chicago*

The 66 M.I.T. Alumni, their wives and friends, who left Chicago on October 28 at 1:00 P.M. for French Lick, had a most enjoyable week end. Our host and hostess were John and Mrs. Barriger '21, and Betty and Stanley deserve much credit for planning a most comfortable and sociable trip on the four special cars of the Monon train that carried us right up to the door of the French Lick Springs Hotel. From the minute the train pulled out of Chicago, John Praetz '28 busied himself passing out questionnaires, program notes, and, best of all, delicious mints, compliments of the Monon Railroad. After this, he was known as the "Mint Man." I could not help but wonder how we could have managed without him and his friendly smile. A deli-

cious luncheon and dinner were served en route in our own dining car and we ordered from a special M.I.T. menu. Meanwhile, it had been announced that, three at a time, we could ride in the cab of the Diesel engine between the various stops. Almost everyone availed themselves of this opportunity and returned with enthusiastic reports. A good many of the group visited the Diesel repair shop of the Monon at Lafayette, Ind.

By this time, we were really becoming better acquainted and had learned that the Elmer Szantays '35 were parents of five girls, including six-week-old "which one had the Toni?" twins; that the Ed Farrands '21 prefer horses to hors d'oeuvres; and that Dutch Seifert and his party of six were Canasta enthusiasts.

From the program, we had learned that there were no formal arrangements for Friday evening, but that after registering and being assigned to our rooms, we could gather in the lobby to enjoy the music, dancing, and other facilities of the hotel. The program also told us that the Barrigers were using the so-called "Governor's Suite" in the new wing as a general headquarters and rendezvous for M.I.T. visitors; also that the Monon Business Car 1 would serve continuously as a hospitality center. The "Tech Pilgrims" were requested to enjoy it at any time but with definite appointments before luncheon and dinner on Saturday.

As to Saturday's plans—in our questionnaires, we had been given the opportunity to sign up for golf, trapshooting, horseback riding, or for the famous French Lick health baths. Also, there were two complimentary Monon countryside tours arranged, one in the morning and one in the afternoon. Most everyone signed up for these tours. The morning tour was to Spring Mill Park with a stop en route at West Baden College at West Baden, Ind. The college was formerly the West Baden Hotel but is now the school of philosophy and theology for Jesuits. The dome on the college is said to be the largest dome in the world without any central support. Our architect and fellow pilgrim, Louis Pirola '26, may know differently, but your Scribe failed to ask his opinion. We also visited an old village at Spring Mill Park, including a corn gristmill which was still running with an old wooden water wheel for power. Here, many of us purchased bags of freshly ground corn meal to take home. We walked about the village houses, studying the old furniture, fireplaces, looms, and so on. It was here that Betty Barriger caught her father eating the raw corn meal by the handfuls.

We all knew that the next thing on the program was a barbecue luncheon at the lodge owned by John Cabot, the proprietor of the French Lick Springs

Hotel. The bus took us safely to this charming spot and, as we came around the bend, the sight of long tables set out in the sunshine near the outdoor grill was most welcome. Steaks were served hot from the grill and we sat down to enjoy a full-course meal. Is there anything in the world as good as a charcoal-broiled steak served outdoors? We learned at luncheon that there had been at least one golf game, that Mr. and Mrs. Rhodes had driven down from Evans-ton, and that we were situated between Orleans and West Baden, Ind.

The bus then left for the afternoon tour to the Marengo Caves, while some of us returned to the hotel to enjoy the health baths, and to rest. We all gathered at the Monon private car for cocktails between six and seven o'clock. At this time, we were introduced to a group of M.I.T. Alumni and their families who had driven up from Louisville at our invitation. Melvin Sack '28 is their president. We regretted very much that they had not been able to join us for the barbecue luncheon. Dinner was served in a private dining room in the hotel. We were then entertained with an excellent movie featuring the Indiana Limestone Company. This was enjoyed by the ladies as much as the men, I believe.

There were a few short speeches. John Barriger told us that the week end at French Lick would be an annual event for the M.I.T. Club of Chicago, if we wish. Mr. Sack, President of the Louisville Club, said a few words and asked us to visit their club when in Louisville. In conclusion, John Praetz presented Mrs. Barriger with a set of matched luggage to show our appreciation of her kindness in acting as a charming hostess for the three days.

Sunday morning was a bit foggy but we learned that 5 ladies and 20 men from our party found their way to church. We all enjoyed a hearty breakfast before boarding the train at 10:15 A.M. We had a good time and a good dinner. A little excitement ensued when the Carrolls discovered their luggage had been left behind but they didn't seem very disturbed. Questions flew back and forth, such as: I wonder why the Fitzgeralds didn't come? Where's Elmer? Who's picking on ye Scribe now? Then as we pulled into Chicago: Aren't you sorry for those who could not come? All good things must come to an end. — BENJAMIN H. SHERMAN '19, *Secretary*, The Firm of Charles W. Hills, 53 West Jackson Boulevard, Chicago 4, Ill.

### *M.I.T. Association of Cleveland*

Cleveland is buzzing with activity these days. This community does not rest, and as it moves, so do the Alumni of the area. Fred Reuter '38, has taken a step which most of us have wanted to

take and have either plunged or wish we had; he has changed jobs, leaving General Electric to join the Victoreen Instrument Company here in Cleveland. Chuck Reed'20, has been spending much of his time in carrying out his "extra-curricular duties as chairman of the building committee of the Clifton Club." Chuck has had to raise the money, push the plans through the board of directors, and now build the beautiful building. He is managing his company and also taking a most active part in the Cleveland Committee for Financing Development. Lew Fykse'41, has been elected vice-president of Standard Tool Company, one of the leading concerns of Cleveland, in charge of engineering. Many congratulations, Lew, rather few men of your age have accomplished so much. Continue to lead the parade. Walter A. Cleveland '98, who had been a regular at our past meetings, has moved to the pleasant atmosphere of Van Nuys, Calif. We wish him the best of luck; particularly from his good friends who, also, are 50-year alumni, F. W. Crosby'90 and H. B. Dates'94. We are proud to have such grand men part of our active and regular group.

An annual event of great importance took place at the University Club on November 16. Ladies were invited and a fine gathering of 100 heard Philip W. Porter, assistant editor of the Cleveland *Plain Dealer*, tell of his impressions of Western Europe, having made an extensive trip there during the past summer. Porter's was one of those talks which ended with a question-and-answer period; and had the speaker's voice not given out, it is quite likely that the exchange of ideas might still be going on. Ilsley Bradley'21, has every opportunity to keep well informed on the social affairs of Cleveland, since his wife is the society editor of the *Plain Dealer*. A short report on the program for Financing Development was given by one of Doc Smith's ('23) staff of workers, and an opportunity was available to acknowledge the contributions of four of our club members. By the time this is printed we will have had our annual luncheon for the students who come home during the holidays. Our Christmas-time luncheon is becoming an institution in Cleveland and one of considerable importance to the students.

Those in attendance at the November 16 meeting were: F. W. Crosby'90, H. B. Dates'94, A. A. Gould'10, C. B. Rowley'12, L. E. Wright'13, W. J. Winninghoff'14, L. R. Westbrook'17, W. R. McKenney'19, C. H. Reed'20, A. I. Bradley'21, J. W. Gartland'21, W. G. Loesch'21, R. J. Roy'21, M. B. Bradley'22, M. K. Sheppard'22, F. H. Wood'22, E. L. Akersley'23, C. H. Hubbard'23, O. N. Stewart'23, H. B. Kline'24, G. F. Way'3d, '24, W. C. Sessions'26, E. E. Staples'26, H. P. Ferguson'27, F. E. Rhinehart'27, R. D. Knight'31, B. W. Steverman'31, J. C. King, Jr.'33, R. H. Valentine'33, C. H. MacFarland'3d,'34, H. C. Babcox'35, Goodwin deRaismes'37, J. F. Keithley'37, G. R. Young'37, F. W. Reuter, Jr.'38, J. P. AuWerter'38, P. B. Farwell'39, M. G. Magnuson, Jr.'39,

R. W. Cobean'40, E. O. J. Helland'40, L. D. Fykse'41, J. W. Kraus'41, C. H. Smith, Jr.'42, W. H. Buckley'48, Noel Davis'49, and D. L. Yeomans'49. That seems to be a good spread of attendance by classes, which in itself is one of the aims of our Club. — G. RICHARD YOUNG '37, *Secretary*, The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

### **M.I.T. Club of Monterrey**

Our winter meetings started on November 11, and we had as guest of honor, Commodore Penn L. Carroll'17, IV, who is now a professor of Electrical Engineering at the Instituto Tecnológico de Monterrey. At each of our future meetings, the member in charge will discuss general engineering problems, or a topic which pertains to his business. We hope that each one of us will take more interest in the Club and derive from it some practical benefits, besides keeping in contact with the local Alumni and our alma mater. Naturally, we all miss H. E. Lobdell'17, who has been our guest so many times. We now consider him one of our members, and hope to have the privilege of a visit from him early next year.

Those present were: Eliot Camarena '44, Juan Celada'44, Bernardo Elosúa'23, Julio de la Fuente'33, Rodolfo González Garza'34, Manuel Llaguno'46, Ramón F. Muñoz'09, Francisco Sada, Jr.'17, Oscar Sánchez Dávila'49, and R. E. Valentine '23. — BERNARDO ELOSUA'23, *Secretary*, Box 360, Monterrey, N. L., Mexico.

### **New Haven County M.I.T. Club**

The Club was, indeed, fortunate to have Dr. Killian with us at our recent fall meeting. To one, who, like your Secretary, has been unable to visit the Institute regularly, Dr. Killian's talk and the movies shown later were most significant. What progress has been made in 20 years — may the next 20 be equally fruitful. Our admiration also goes out to the evening's introductory speaker, our own Charlie Smith.

Those present were: A. H. Jameson'93, C. E. Smith'00, E. H. Davis'01, J. R. Putnam'01, Tracy Smith'07, H. G. Manning '12, E. W. Taft'13, R. L. Parsell'14, R. H. Perry'14, O. P. Camp'15, G. V. Maconi'15, F. G. Purinton'15, J. R. Freeman, Jr.'16, Herbert Gfroerer'16, F. O'L. Killorin'17, H. N. Solakian'17, C. W. Blanchard'18, H. R. Polleys'18, C. J. Farist'19, H. H. Mardoian'19, R. H. Pease '19, V. C. Cole'21, C. A. Williams'21, A. R. Wood'21, E. D. Coogan'22, W. D. Pinkham'22, Dr. J. L. Hetzel'23, S. B. Metcalfe'23, W. R. Weeks'24, B. R. Hubbard'25, D. C. Chase'26, E. B. Haskell '26, M. A. Jenckes'26, J. R. Killian, Jr., '26, A. P. Libbey'26, W. M. Crane, Jr., '27, G. B. Darling'27, L. B. Grew'27, Louis F. Pike'27, G. B. Yudkin'27, P. E. Harvey'28, R. W. Purssell'28, F. P. Nettleton'30, H. F. Bariffi'31, F. E. Brooks, Jr.'31, J. N. Higgins'31, A. M. Plant'31, J. E. Kearns'32, J. L. Tobey'36, A. M. Tremaglio'36, A. I. Blank'37, P. H. Dreissigacker, Jr.'37, C. F. Healey'37,

C. A. Lytle'37, W. S. Wojtczak'37, E. W. Lovering'38, Nathan Kulbersh'39, Lawrence Perkins'39, H. H. Gurian'40, J. B. Gardner'44, Peggy Bowles Smith'44, H. R. Sommer'44, E. L. Belcher'46, D. G. Black, Jr.'46, C. E. Miller'46, J. L. Wandrisco'46, M. J. Daly'3d,'47, D. W. Kornreich'47, J. E. Krantz'49, and C. E. Smith, Jr.'49. — ALBERT P. LIBBEY'26, *Secretary*, Box 238, Stony Creek, Conn.

### **M.I.T. Club of Schenectady**

The Club met at noon on October 18 to hear Arthur G. Blessing, Director of City Planning for the city of Schenectady, speak on the aspects of his work as applied in the city. Introduced by Ed Lawrence'47, the speaker outlined the means by which the commission strives for a balanced pattern of civic development, with attention being given especially to traffic, civic services, residential areas, recreation, slum clearance, public transportation, development of terminals for intercity transportation, establishment of a business and industrial atmosphere, general city appearance, and, in general, to any program which will further the welfare of the citizens. The Schenectady Planning Commission is made up of nine men, serving without pay, who act as advisors to the City Council on the above matters, with special attention being given to capital improvements and the means of financing. After his talk, the meeting was opened for questions.

Present were: R. C. Robinson'01, W. C. Taylor'02, V. Y. Dunbar'16, E. H. Bancker'18, H. W. Bibber'20, K. P. Coachman'22, T. R. Rhea'24, B. S. Weaver'25, A. D. Hoadley'26, P. W. Sayles'29, C. F. Barrett, Jr.'34, Harold Chestnut'39, A. G. Pincus'40, I. W. Collins'41, G. M. Ketchum'41, R. H. Simon '41, R. W. Stanhouse'41, R. W. Austin '42, E. S. Lawrence'47, J. F. Robertson, Jr.'47, A. M. Varner'47, and T. J. E. Glasson'48.

The \$20,000,000 Development Program was officially launched in the Albany-Schenectady-Troy area by a dinner at the Hotel Van Curler in Schenectady on November 17. Presiding at the speakers' table was A. P. Kellogg'24, Chairman of the Schenectady district. With him were the members of his advisory committee, W. R. Whitney'90 and W. D. Coolidge'96, as well as the chairman of the Albany district, B. R. Rickards'99. Also present for the Schenectady district were: H. L. Shuttleworth'2d,'37, Amsterdam area; F. P. Doane, Jr.'20, Glens Falls area; and R. K. Phelan'30, Canajoharie area. After dinner and the showing of the movie, "M.I.T. at the Mid-Century," Ralph T. Jope'28 made some opening remarks on the progress of the drive. He then introduced Horace Ford, Treasurer of the Institute, who gave us an excellent story on the ways in which the new Technology is, and must continue to be, "bigger, better, and busier" than the old. With the inspiration of his talk, the Schenectady area could hardly fall short of its goal.

Other area Alumni present, besides those mentioned above, included: K. A. Pauly'96, J. B. Taylor'97, R. C. Robin-



son'01, P. L. Alger'15, E. H. Bancker'18, H. L. Wirt'18, H. W. Bibber'20, K. P. Coachman'22, C. J. Koch, Jr.'23, K. R. Van Tassel'25, A. D. Hoadley'26, G. C. Houston'27, A. J. Tacy'27, P. W. Sayles'29, Harold Chestnut'39, D. H. Marquis'41, Lee Martin'42, David Jealous'44, and W. B. Rodeman'44.

Preparations are now under way for a dinner meeting late in January with H. E. Lobdell'17 as guest speaker. Any Alumni in the area who have not received notices from the Secretary, and who are interested in this meeting, should write to him at the address below. — IVOR W. COLLINS'41, *Secretary*, General Electric Company, Building 273 E-212, Schenectady 5, N.Y.

### ***M.I.T. Club of Southern California***

The unexpected death of Ken Kahn '15, X, in the early part of 1949 removed one of the most loyal Alumni from our active councils. Although his output of material to the McGraw-Hill publications and his work at Lockheed Aircraft were prodigious, he found time for all Technology meetings and was the guiding genius of the 1946 directory — the first of this area. Ken has been and will be missed. The 1946 directory is one of the monuments to his constructive efforts.

The largest group in years gathered on October 17 at the University Club for fellowship and to hear Lee A. DuBridge, President of the California Institute of Technology, speak on "Recent Atomic Developments." Dr. DuBridge prefaced his speech with an analysis of the common bonds of M.I.T. and the California Institute of Technology on the two coasts in relation to the economic life of the United States, and spoke of the five years of his close personal association when heading the Radiation Laboratory at M.I.T. during World War II. As a result, he has the distinction of having been made an honorary member of the M.I.T. Alumni Association. The preliminary plans for the "Manhattan Project" were given and the sacrifices of the many scientists who left their usual positions and co-operated to produce the atom bomb in about one-third the time that the most optimistic predicted. Most investigations start from some "lead" which is developed further, but this one had to make its own paths as it traveled.

The Los Angeles newspapers stressed the admonition of Dr. DuBridge that nature's secrets are open to anyone in the world who will do the necessary work to unravel them and that the world has always moved much faster if knowledge was freely interchanged among the scientists in various countries. "Progress in peacetime use of atomic energy is hampered now by too much secrecy. That should be restricted to the military applications." Dr. DuBridge was most heartily applauded for his masterly presentation of a subject in understandable language.

At the head table were the officers of the Club and their wives: Bates'29, Beebe'10, Geyer'26 and Cunningham'27; also Sammis'28 and Mrs. Sammis'29, who, respectively, led the singing and furnished

the accompaniment. The ladies were a welcome feature of this meeting — approximately 60 wives adding greatly to the occasion. The arrangements were in charge of Morton'13, Blitzer'46, Stanley'44, Postal'25, Stadig'41, and Day'48; with Cunningham'27 in charge of reservations. The question-and-answer period was enjoyed by all. Dr. DuBridge gave us much interesting information.

Among the Alumni present were: M. A. Abel'41; A. E. Acker'37; J. M. Andreas'37; A. L. Antonio'37; H. A. Babcock'12; W. W. Baldwin, Jr.'39; H. E. Beebe'10; E. C. Belknap'45; E. E. Bennett'07; A. B. Berghell'32; S. D. Blitzer'46; L. D. Black, Jr.'43; G. B. Blonsky'25; D. J. Bloomberg'26; Z. M. Briggs'00; Louis A. Brown, Jr.'19; H. H. Calvin'12; E. W. Carlton'25; S. O. Clements'08; R. T. Collier'18; R. W. Conant'23; J. A. Crutcher'42; G. M. Cunningham'27; R. E. Day'48; R. G. Dickey'47; Thorn Dickinson'14; J. B. Dingler'32; C. C. Dubbs'35; S. G. Eskin'26; B. F. Flynn'23; H. W. Geyer'26; K. C. Grant'02; F. W. Grant-ham'25; F. G. Harmon'23; I. E. Hattis'34; Roger Hayward'22; F. L. Healy'21; B. B. Helfand'43; J. W. Hemphill'22; J. B. Henderson'37; Rockwell Hereford'24; P. A. Herrick'24; H. M. Hickok'03; W. A. Hopkins'06; R. B. Jackman'32; H. S. James'15; R. E. Keyes'40; W. H. Lazear'23; W. S. Libbey, Jr.'43; J. P. Livadary'22; W. H. MacCallum'24; C. S. McCann'23; C. L. Maltby'22; Raymond Mancha'26; F. W. Marlow'21; F. S. Mayer, Jr.'41; William Mellema'15; L. C. Miller'28; H. M. Morley'03; F. B. Morton'13; D. B. Myers'08; D. H. Nelson, Jr.'48; Bertha Ogden'25; T. W. Osgood'05; L. A. Parker'06; E. G. Pollak'40; Harry Postal'25; Walter B. Rivers'15; Constance Sammis'29; F. W. Sammis'28; R. V. Scott'48; P. P. Shelby'32; S. M. Spaulding'16; G. D. Spear'17; O. K. Smith'40; R. A. Smith'43; J. E. Stadig'41; Victor Stanley'44; P. S. Starrett'48; H. H. Strauss'38; W. G. Sutton, Jr.'43; J. H. Thacher, Jr.'42; C. H. Toll, Jr.'23; G. L. Uman'12; J. Whitman'49; P. G. Whitman'13; W. H. Williams'31; J. R. Wilson, Jr.'46. — HIRAM E. BEEBE'10, *Secretary*, 1847 North Wilcox Avenue, Hollywood 28, Calif.

### ***The M.I.T. Club of Quebec***

The Club opened its 1949-1950 season with a dinner meeting on October 27 at the Berkeley Hotel in Montreal. Our guest was Julius A. Stratton'23, the Institute's provost. Mr. Stratton entertained us with an interesting review of the more recent activities at M.I.T. in both the administrative and educational fields, including a description of his own duties.

Alumni present at the meeting were: Thomas L. Brock'38, Malcolm L. Carey'23, Harry S. Chandler'08, Leon A. Fraikin'31, Ferdinand J. Friedman'08, Arthur W. Germer'23, Ernest R. Hammond'39, René Laplante'30, Jacques R. Laurence'40, Jou J. Lee'46, Donald E. MacNair'50, George K. Marshall'41, Huet Massue'15, F. David Mathias'36, Humphreys Milliken'02, William K. Nonnenman'36, William J. Pead, Jr.'11, Harold C. Pearson'23, Alexander D. Ross'22, and Gabriel E. Rousseau'25.

The territory of the Club includes the province of Quebec and the 10 most easterly counties of the province of Ontario; i.e., east of an approximate Kingston to Pembroke line. Any M.I.T. alumnus living in that territory, and not already on our mailing list, should get in touch with the Secretary at the address below. JACQUES R. LAURENCE'40, *Secretary*, 1430 St. Denis Street, Montreal 18, Quebec, Canada.

### ***M.I.T. Club of Shanghai***

We are very pleased to report a letter from the Secretary of the Club with comments concerning the May issue of The Review. The mail situation is rather difficult in China and Mr. Hyui's letter, mailed in September, was not received by us until the end of November. We wish to apologize to the Secretary at this time for a misprint which appeared in his May notes. At the time of the Shanghai Power Company's "Open House" at its Riverside Steam Electric Generating station, the program featured a tour of this 200,000-kilowatt plant — not 2,000-kilowatt as printed in the May issue.

The Secretary closes his letter with the news that: "... as far as we know, all of our members here have been getting along more or less normally since the 'liberation.'" — VINCENT S. HYUI'37, *Secretary*, in care of Transport Division, Shanghai Power Company, 375 Kowloon Road, Shanghai, China.

### ***M.I.T. Club of Western Maine***

A dinner meeting of the Club was held on the evening of November 16 at the Eagle Hotel in Brunswick, Maine. James E. Barlow'05, President of the Club, presided and speakers included Harold C. Dudley of the M.I.T. Development Program, who presented the sound movie in color, "Technology at Mid-Century"; Donald Severance'38, Alumni Secretary-Treasurer, who brought greetings from M.I.T.; and William S. Newell'99, who introduced the guest speaker, Admiral Edward L. Cochrane'20, retired, now Head of the Department of Naval Architecture at the Institute, who spoke freely and interestingly upon the topic, "National Defense."

Alumni and guests present included the following: Mrs. James E. Barlow, Carroll P. and Mrs. Bailey'30, C. Hall and Mrs. Baker'22, John C. and Mrs. Barker'20, Charles A. and Mrs. Bartlett'27, Elliot M. and Mrs. Bates'48, Winfield H. and Mrs. Bearce'29, Walter S. Bennett'30, James C. Boyd'93, Abbie M. Buck'40, Charles H. and Mrs. Campbell'28, David R. and Mrs. Campbell'26, George and Mrs. Cary'37, Dan and Mrs. Christie, Horace and Mrs. Clark'09, S. A. Dudley'41, Daniel W. and Mrs. Gibbs'10, Arthur Gilmour'17, Rudolph Greep'34, Richard Hallet, The Rev. Gertrude G. Harris'24, Melvin Henderson, Stanley W. Hyde'17, John F. Langmaid, Jr.'31, Fred C. Mabee'07, Russell MacLeod'39, Ruth Montgomery, sister of Frank Montgomery'02, John R. Newell'34, John and Mrs. Ness'31, Lewis D. Nisbet'09, Edward J. and Mrs. Norris'31, Cecil E. and Mrs.



Paine'93, Willard B. Purinton'22, Richard R. and Mrs. Raven'43, J. Albert and Mrs. Robinson'02, The Hon. and Mrs. Arthur Sewall, William D. Sewall'48, Arthur Stearns'90, Theresa Stuart, Selwyn H. Towne, Jr.'29, and Mrs. Towne, Edward D. and Mrs. True'27, Joseph Warren'91, Cadwallader and Mrs. Washburn'93, John W. L. and Mrs. White'44, Philip and Mrs. Wilder'23.

This was the first meeting of the Club since a small but select group gathered at Popham Beach for a clambake in August, 1948, to honor H. E. Lobdell'17 and Bill and Margaret Rivers'26. That gathering was never reported in *The Review*, and to inquirers who asked about "the next clambake," we can only say that we made a pact with Bill Rivers for one in 1951; when we understand he will next be here on a "sabbatical" from India. The Secretary of the Club will appreciate hearing from any Alumni in the region who did not receive notices of this meeting. — STANLEY W. HYDE'17, *Secretary*, Ledgewood, Phippsburg, Maine.

### **The M.I.T. Club of Western Pennsylvania**

The Club held its regular monthly meeting on October 18 at the University Club in Pittsburgh. President George Hoffman'28 introduced the new members of the board of directors for three years: Aaron Redcay'34, Mark Greer'26, and R. G. Lafean'19. The other officers were also introduced: Henry Rockwood'32, Vice-president; George Morrisette'35, Secretary; Charles Peck'41, Treasurer; Lewis Johnson'43, Assistant Treasurer. The treasurer's report was read and approved. President Hoffman informed us of the passing of D. C. Bakewell'11, Vice-president in charge of sales for the Blaw Knox Company, and discussed our program for the coming year.

The meeting was then turned over to Rusty Toolin'39, who introduced our speaker, Mr. Dunker, the manager of engineering at the Heinz Company. Mr. Dunker divided his talk into three parts: The film, "Ever Since Eden," which showed the history of food processing, stressing the tomato; a brief history of the Heinz Company and their particular engineering problems; and a discussion period.

The following Alumni attended: C. T. Barker'27, E. M. Barnes'23, W. J. Bates'35, H. L. Bone'17, G. I. Clark'41, E. J. Cole'44, D. B. Demond'18, J. E. Haggett'47, W. C. L. Hemeon'26, G. M. Hoffman'28, L. K. Johnson'43, M. H. King'25, A. L. Klieves'01, R. G. Lafean'19, H. L. Lang'09, G. A. Ley, Jr.'46, J. W. Logan, Jr.'20, E. F. Lynch'32, I. E. Madsen'33, C. H. Mohr'33, G. C. Morrisette'35, E. F. Murphy, Jr.'41, A. K. Redcay'34, F. G. Richards'34, Henry Rockwood'32, R. G. Schmidt'48, E. A. Soars'21, R. N. Thompson'40, and P. R. Toolin'39.

The November 14 meeting was opened by the President, and the minutes of the previous meeting were read and approved. The meeting was turned over to Rusty Toolin'39 who introduced our speaker, Norman J. Padelford, Professor of Inter-

national Relations at the Institute. Professor Padelford gave us a very interesting and informative talk on international relations. He spoke first of what is going on at the Institute and how M.I.T. and its work have been brought to the attention of foreign nations. Since before the War, there has been an increased desire on the part of these countries to send students to Technology. Professor Padelford then spoke of the place of the study of international relations in the curricula at the Institute and of the number of M.I.T. graduates who are working in other countries. Last summer, Professor Padelford made a tour through Europe and he spoke of what he saw there, particularly as compared to his trip in 1945. A question and discussion period followed, and was broken up only by Professor Padelford's having to catch the train back to Boston.

The following Alumni attended: C. T. Barker'27, W. J. Bates'35, W. U. C. Baton'04, E. L. Chappell'24, E. J. Cole'44, I. M. Cramer'47, D. W. Dimock'28, M. M. Greer'26, R. D. Hoak'28, G. M. Hoffman'28, A. L. Johnson'43, L. K. Johnson'43, R. G. Lafean'19, H. D. Lawton, Jr.'47, H. A. Leone, Jr.'48, S. D. Miller'32, C. H. Mohr'33, G. A. Morrison'09, G. C. Morrisette'35, C. F. Peck, Jr.'41, A. K. Redcay'34, Henry Rockwood'32, W. F. Schaefer'48, W. W. Simpson'48, E. A. Soars'21, P. R. Toolin'39, F. P. Walden'28, R. C. Wellwood'33. — GEORGE C. MORRISSETTE'35, *Secretary*, 469 Mapleton Avenue, Mt. Lebanon, Pittsburgh 28, Pa.

list of living '86 Alumni, both M.I.T., and S.M.A., published in the 1948 Register numbers 66, of whom I have recent addresses of some 30.

"Could we set an individual figure at 10 per cent of the average of our income for the three years 1946-47-48, as reported on our Federal returns, those receiving more income paying more and those receiving less contributing less but in the same relative proportion? Please let me know your reaction to the suggestion before October 20 so I may report in the December Review." If any of the other 25 who received the letter would write in regard to the suggestion or any modification of it, it would be helpful. The Secretary has already been approached by one of the committee who was informed of the above plan so that nothing further could be said at that time. If the secretaries of any of the later classes who have read the Notes have attempted similar undertakings, I should like to be informed about them.

The Secretary is personally much interested in the proposed change in the calendar as suggested in the *Journal of Calendar Reform*. If the readers of this column would look into the plan and send me their O.K., it would help in ascertaining the reaction of an intelligent public to the idea. Information may be obtained by addressing the World Calendar Association, Inc., International Building, 630 Fifth Avenue, New York 20, N.Y. — ARTHUR T. CHASE, *Secretary*, Post Office Box 4, Island Creek, Mass.

### **• 1890 •**

William P. Flint is, as in previous winters, at 3726 First Avenue North, St. Petersburg, Fla. Your Secretary, who has represented the Montana Alumni Association of M.I.T. on the Alumni Council since 1916, has now been transferred to represent the Class of 1890, taking the place of Harry Goodwin. As Will Creden has been president of the Montana Club much of this time, it has offered an opportunity to continue an enjoyable contact. Creden has been sent an urgent invitation to come back for our reunion.

While it is early to make definite commitments for our 60th anniversary, Charles Sherman and I think we should get a line on what the Class would like to do and propose writing or seeing as many as possible at an early date. Alumni Day, 1950, will be on Monday, June 12, and there will be exercises in the morning, a noon lunch in Du Pont Court, and a banquet at the Copley-Plaza in the evening. It has been suggested that '90 might get together on Monday sometime between luncheon and dinner, but Alumni Secretary Severance thinks we shall wish to attend the afternoon functions of the Alumni Day Program and believes we would not have much spare time. For a real talkfest we might well have dinner on Sunday afternoon and continue swapping yarns through the evening. If not over 25 are to be present, this could be at the Silver Room in Walker Memorial. If more than that number, arrangements would be made with some hotel, wherever the Class might prefer. With 57

## **CLASS NOTES**

### **• 1886 •**

Early in October the Secretary sent to '86 Alumni the following letter, asking for prompt reaction in order that the report might be published in the December Review. To date only five replies have been received. A copy of the letter follows: "Dear Fellow Alumnus M.I.T. and S.M.A. '86: No doubt you are aware of the \$20,000,000 Fund that the M.I.T. Corporation is trying to raise for M.I.T. expansion and to which Alfred P. Sloan has given \$1,000,000. I do not recall that the Class of '86 ever made any memorial M.I.T. gift either on their 25th or 50th anniversary! While many '86 men, undoubtedly, have given individually, there apparently has been no concerted '86 class action. Why not start such an undertaking at this time, sending in your pledges to me but no checks until we find out what we can do as a class. Then your checks can be sent to the Alumni Secretary who will keep me informed. What do you say, boys? Does the plan strike you as desirable? I do not suppose we can do much, as I never heard of a Class of '86 millionaire, but it would show our interest and give us the feeling of being part of a tremendous undertaking, even though relatively in a small way. The

class members living and many still active in business or working on hobbies, we should have at least 15 in attendance. This number would be increased if wives and other guests are invited to join us. — GEORGE A. PACKARD, *Secretary*, 53 State Street, Boston 9, Mass. CHARLES W. SHERMAN, *Assistant Secretary*, 16 Myrtle Street, Belmont 78, Mass.

## • 1894 •

The New Hampshire Sunday News of October 9 carried an article which will interest men in our Class. Norwin Bean is one of the owners of an old steam fire engine, built at the Amoskeag Manufacturing Company in that city in 1871, and which was used in combatting the great Boston fire of that year. The machine was designed by Bean's father, who was the engineer member of the firm that constructed it. This is probably one of the oldest of the few machines of that general type now in existence and is a veritable museum piece. As a matter of fact, it is more than that for it can still operate, and on October 8 was given a workout for a few hours in Manchester. The report stated that: "Hissing live steam and belching black smoke the 78-year-old steam pumper lived again. As it snorted and throbbed and sent out two streams of water about 100 feet straight up into the air, pulses of four generations of firemen who gathered for the test quickened practically in direct proportion to the height of the streams reached. This pumper has had an interesting history. With the advent of new types of fire fighting equipment it was destined for the scrap heap but was rescued by a man who saw its historic value, and at the test was operated by a Manchester resident who is a collector of old fire pumps, both steam and handtub. Early in the test the fire was given a poke and the pressure mounted to nearly 100 pounds to the square inch, the hoses swelled and the streams shot skyward, and before they were through the pump had built up to 140 pounds pressure with the boiler at 70 pounds per square inch." It must have been a grand day for Bean who obviously should take great pride in his father's work, and in partial possession of this interesting relic of the fire fighters' equipment in an earlier day.

Members of the Class will be pleased to know that an oil portrait of Raymond Price has been painted by the eminent and exceptionally skillful artist, H. Bingham Ballou of Medford. He was the artist who painted the portrait of your Secretary, which was given to the Institute, and has since done another which adorns the Institute walls — Robert S. Williams, retired Head of the Department of Metallurgy. The portrait of Price was sent to Paris during Mrs. Price's stay there last summer, and she reported that the French portraitists greatly admired it and expressed surprise at the great skill of this American artist. Is that what is called "insularity"? The portrait has returned to America and it is the Secretary's hope that it will ultimately rest here in Cambridge. It is certainly a notable piece of portraiture.

Many of the Class may have seen another type of artistic expression done by a '94 man and his son. Arthur Shurcliff has prepared plans for the landscaping in connection with the new boulevard along the south shore of the Charles River Basin between the two bridges nearest to the Institute. Whether this plan will be one fully carried out cannot be positively stated here, but it seems probable at this time. The work on the new drive is now progressing. It was made possible by the generous action of Mrs. James J. Storrow and should be a memorial to her husband. It will certainly help the traffic problem in the area by providing a parked boulevard for rapid transit for motor cars along the river. Shurcliff's plan was shown in detail in a Sunday Herald. The Class congratulates both Shurcliff and the city.

Since our reunion, several letters and telephone conversations have brought news of classmates. Alan Claffin proudly reports two new great-grandchildren — Susan Heath, granddaughter of A. Avery Claffin, Jr., and Maconda Goodspeed, granddaughter of Mrs. Pratt who attended our reunion with her father and mother. Those of us who met the charming Mrs. Pratt could hardly believe that she was sufficiently aged to reach the grandmother stage. Both Mrs. Pratt and her husband are sculptors and practice this artistic profession in Seattle. Some of the new buildings in that bustling city bear the evidence of their skill, as Mr. Pratt is especially noted for his work in the architectural field. — It is a pleasure to report that Harold Chase has recently undergone a necessary operation for cataract with highly satisfactory results, so that his sight is better than for several years.

A letter from Billie King expresses pleasure regarding the recent reunion, and particularly mentions the fine action of Harry Warren in sending color photographs to those present. Billie and Mrs. King stayed through October at their cottage at Lake Hopatcong, but are now back at 50 Morningside Drive in New York. Billie was invited to attend the big dinner at the Waldorf arranged by Sloan '95, Duncan Linsley '22 and Haslam '11 for the Committee on Financing Development, at which President Killian '26 spoke of this great project.

A letter from Charles Abbot was enthusiastic in regard to his research at the Smithsonian where, after having been its head for many years, he now has the modest title of research associate. His activities seem not to be reduced, but rather increased with the passing years. Some months ago he wrote a most interesting little book entitled *Uncles* in which he presented the characteristics and abilities of his forbears and other nearly related members of the famous family of Abbots of which he is certainly one of the most distinguished members, and, doubtless, has the most far reaching reputation because of his brilliant scientific work.

It is again my sad duty to report that we have lost two members in recent weeks. John W. Chapman died on October 28 at his home in Newtonville, at the age of 76. Born in Hyannis, he entered Technology in 1890 and was graduated from Course II in '94. He was for

several years associated with the Underwriters Bureau of New England and the New England Insurance Exchange. In 1920 he became associated with the North British and Mercantile Insurance Company, Ltd., and retired in 1940. He was a Mason and a member of St. John's Episcopal Church, and a former member of the Albemarle Golf Club, the Newton Club, and the Hunnewell Club. His funeral was held at St. John's Church in Newtonville, with burial in Cedar Hill Cemetery in Hartford, Conn. A very quiet but always friendly man, he only occasionally attended our class reunions, and his classmates, therefore, had limited opportunities to enjoy his companionship. The other member who has gone from us is the Rev. Francis M. Adams, who died on July 25. Leaving the Institute after but one or two years, he studied theology and held pastorates at a number of places in Maine and Connecticut. His death occurred at Kingstree, S.C. The Secretary has no details as to his family. He has never been in attendance at any of our class events since graduation.

The Secretary must admit that he has been somewhat peripatetic in 1949, having gone twice to the West Coast to attend conventions of organizations in which he has scientific or business interest. The February trip has been previously reported. In late June he went to San Francisco especially for the convention of the Institute of Food Technologists of which he is reputed to be the founder, and which now has about 3,000 members. While in that city he also attended the convention of the American Nurserymen's Association for business reasons, since the Benjamin Chase Company of Derry, N.H., of which he is president and his son, Samuel C. '33, is treasurer and general manager, supplies large quantities of wood specialties, labels and stakes, to plant nurseries all over the country. In addition to these cross-country runs, he had a most enjoyable 20-day motor trip to the Maritime Provinces in September with Mr. A. N. Murray, President of the Murray Printing Company of Wakefield. In between times, he read the proofs of the second edition of *Industrial Microbiology* which the junior author Cecil G. Dunn '30, Associate Professor of Industrial Biology at the Institute, had completely revised and greatly enlarged. To him should go all the credit for this book in its new form. Interestingly, requests for permission to translate have come from Spain, Argentina, and Korea. To fill in his time, the Secretary has partially completed the first draft of a history of M.I.T. up to the time when it literally ceased to be "Boston Tech" and moved to Cambridge in 1916. This is a self-imposed task, but it is the writer's hope that it may be regarded as worthy of publication as a concise and authentic record of the Institute from its beginning up to the time of moving from Boston. — SAMUEL C. PRESCOTT, *Secretary*, Room 5-213, M.I.T., Cambridge 39, Mass.

## • 1895 •

Rudolf F. Haffenreffer, our genial mate, has been a "good Elk" for a period of 50



years, and he was honored at a testimonial dinner on September 25 by the Fall River Lodge, Order of Elks. He received a life membership and a plaque denoting his affiliation for 50 years. In his honor, a class of candidates were initiated as the Haffenreffer Class. — Joe Walworth spends his summers in Andover, Mass., and his winters in Florida. He is now at Lake Side Inn, Mt. Dora, Fla.

We have just learned of the passing of Arthur Davis Dean, on November 20, in the Danbury Hospital after a long illness. His home was in Brookfield Center, Conn. Dean started his education in the Rindge School in Cambridge, Mass., then received his B.S. degree in Course VI from M.I.T. in 1913, he received a graduate degree from Alfred University. He started his career as assistant principal in the Technical High School, Springfield, Mass., from 1899 to 1905. He was supervisor of evening schools of the Young Men's Christian Association in Massachusetts and Rhode Island from 1906 to 1917, and a professor of Vocational Education at Teacher's College, Columbia University, from 1917 to 1928. He investigated possibilities of industrial and agricultural education in Puerto Rico for the insular government, edited *Investigation of Conditions in the Shoe Industry*, and served with the National Society of Promotion of Industrial Education. He also assisted in the investigation of apprenticeship systems in the United States Department of Interior, was a director of the New York Prison Survey Commission, and has been an associate editor of *Industrial Education*.

In 1910, Dean was named chief of the trade school division of the educational department of the state of New York. He mapped out a plan under which apprentice mechanics perfected themselves for important positions requiring a practical technical knowledge. A major in the Army in 1918–1919, he worked on reconstruction in Army hospitals. He filled a Federal civilian defense post in the Connecticut Forestry Service in 1942–1943. He was president of the Eastern Art and Manual Training Teachers Association and a member of the National Arts Club of New York. Arthur Dean was author of *The Worker and the State*, *Our Schools in War Time — And After*, *Just Between Ourselves*, and also had written two newspaper syndicate features, "Your Boy and Your Girl" and "Let's Talk It Over." He is survived by his widow, Mrs. R. Elizabeth Dean.

While there are a few of us left to carry on, let us thoughtfully consider what blessings we have and wish one and all continued strength and happiness throughout 1950. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

## • 1896 •

Greetings to all and best wishes for the year ahead. In view of the outstanding accomplishments of so many of our classmates, the inscription on the plaque in the Rockwell Athletic Cage seems trivial. However, it is a matter of interest to the Class and may quite properly be added to other items that go to keep us informed

of what is going on in and around M.I.T.: "Named in honor of John Arnold Rockwell '96, M.D. Member of the Alumni Advisory Council on Athletics from its organizational meeting on January 18, 1898, until it was succeeded by the Athletic Board on June 5, 1947. For nearly fifty years, undergraduate life at the Massachusetts Institute of Technology was enriched by his faithful and effective service to athletics."

Marshall Leighton has come up with one of his characteristic letters: "The class notes for 1896 in the November number of *The Review* indicate that you and Damon have done some painstaking and highly creditable work, and I cannot restrain the impulse to express my thanks to you both. The reading of them gave me a feeling that I had come home for a visit after a long absence. The old names revive memories that are delightful and satisfactory. The only man mentioned with whom I am rather frequently in touch is McAlpine and, probably, the reason for that is that we are both professionally active and reside in the same city. Speaking of activities, I cannot quite accustom myself to the idea that so many of the men are retired. At the same time, the facts remind me how happy I am and should be that I am not retired. Some people have the gift of graceful retirement, but it happens that I have not that gift. It seems as though were I forced to retire, I would rapidly pass into the long future state. It still pleases me when I reach the office in the morning earlier than anyone else; and when it becomes necessary, I can put in overtime until the small hours of the morning. I count it all as God's blessing and try always to show my appreciation of it.

"Mrs. Leighton is still with me — the same girl at whose wedding you were an usher. I still vividly recall that on that occasion you were the leader of that gang of ruffians that tied old shoes and defunct wash boilers to our going-away hack. While Mrs. Leighton is not as robust and active as I, she, nevertheless, stacks up mighty well for a lady of her age. The last four lines of your notes are a reminder that I have not paid my class assessment. Perhaps my delinquency is explained by the fact that dear old Charlie and I had a 'system.' Years ago, I chided him for failing to write me a letter, and I told him that thereafter I wouldn't pay anything except in response to his letter of request; such a resort seemed to be the only way that I could get word from him. The scheme worked to my satisfaction and, from all appearances, to Charlie's, too. Years ago, you used to make an annual pilgrimage to Tennessee and every now and then you would stop at Washington and drop into my office for a chat. Now I am wondering: (a) Whether you don't go to Tennessee anymore, or (b) whether you don't love me anymore. Is it the one, or the other, or both?"

A letter from Bill Anderson reports that he is somewhat incapacitated, but gaining, for which we are all grateful. Bill Haseltine sent a note with his class dues as did Helen Dodd who wrote: "Isn't it amazing that Dr. Montagu, for his article on 'Training for Family Living' (*The Re-*

*view*, November, 1949), should choose a photograph of the very village where Walter and I undertook to live and work out his principles! I still believe we were on the right track — but there aren't enough of us yet." — Myron L. Fuller is now at 4 Rhode Island Avenue, Ft. Myers, Fla. Why not send in *your* dues for \$2 if not already attended to? — JOHN A. ROCKWELL, *Secretary*, 24 Garden Street, Cambridge 38, Mass. FREDERICK W. DAMON, *Assistant Secretary*, 275 Broadway, Arlington 74, Mass.

## • 1897 •

Allen W. Jackson, IV, died in Lincoln, Mass., on November 4, 1949, at the age of 74. For many years he maintained an architectural office in Boston. He specialized in old English architecture and was author of the book *The English Half Timber House*. He was a member of the American Institute of Architects, the Boston City Club and the Technology chapter of the Delta Kappa Epsilon Fraternity. Allen was an enthusiastic supporter of all class activities and was always present at our outings. He will be greatly missed at future reunions. He leaves his wife, one son, two daughters and a sister.

David Demarest Cassidy, IV, died on October 6, 1949, in Amsterdam, N.Y., at the age of 77. Mr. Cassidy was born in Amsterdam and was educated at Amsterdam Academy, Phillips Andover Academy, Union College and the engineering school at Harvard. In 1895 he came to M.I.T. and became affiliated with our class. In 1896, as a student in the summer school of Architecture at the Institute, he journeyed 3,100 miles by bicycle in England and France, studying the architecture of those countries. On leaving the Institute, he was for a short time employed as draughtsman in several architectural offices in New York City. In 1898 he returned to Amsterdam and took up the practice of architecture. In 1915 he began research work on stairs, stairways, walkways, ramps, and so on to the end of improving safety and comfort to individuals. In his earlier years he was quite prominent in civic affairs in his native city. He served as secretary of the Chuktanunda Gas Light Company and was also a director and vice-president of the Amsterdam Board of Trade. He was a member of the M.I.T. Club of New York and of the Union College chapter of the Alpha Delta Phi Fraternity. He was also a member of the Elks. He is survived by his wife, one daughter and two sons.

George Wadleigh advises us that Edgar M. Hawkins, who has been for many years with the Eastman Kodak Company in Rochester, N.Y., has taken up his residence in Cohasset, Mass. We shall expect to see Edgar at all future class reunions. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

## • 1899 •

John Berton Ferguson, I, is located at Hagerstown, Md. After he graduated from M.I.T., he went into railroad engineering, first as assistant division en-



gineer for the C. B. and O., then as assistant supervisor of the Pennsylvania Railroad, and later as roadway engineer of the Ohio Electric Railway. During 1909, he organized the J. B. Ferguson Company, the name of which, in 1909, was changed to the J. B. Ferguson Engineering and Construction Company. During World War I, John was supervisory engineer at Camp Eustis and at the Projects and Balloon School, both on the Virginia Peninsula. In World War II, he was architect engineer at the Richmond (Army) Airfield at Richmond, Va. Since 1949, he has been a director of the Western Maryland Railway Company.

Christina Hollowell Garrett, IV, prepared for M.I.T. at Miss Case and Miss Haswell's Schools in Philadelphia. She received the degree of B.A. from Bryn Mawr in 1914 and the degree of M.A. from Radcliffe in 1923. She was a teacher of history in Winsor School in Boston before going to England and the Continent where she has been a research student in history since 1938. Among her publications are the *Marion Exiles*, Cambridge University Press, and historical and biographical sketches in *History and The Library*.

Notice has been received of the death of Dr. Benjamin S. Hanna of Norfolk approximately two years ago, but no details are at this time available. — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. MILES S. RICHMOND, *Assistant Secretary*, 201 Devonshire Street, Boston, Mass.

## • 1900 •

We regret to have to announce that our Golden 50th Reunion cannot be held at East Bay Lodge as we had hoped. The manager of the Lodge, who had tentatively booked us, now finds that it will be impossible for him to open the Lodge as early as our reunion date. We are investigating several other possible places and hope that before this issue of The Review reaches you, we will have been able to notify you where the reunion will be held. We are sure that there are other places just as attractive and satisfactory as East Bay.

A letter from Harry Morris, quoted in this column last month, mentioned the death of Dan Johnson. Etheredge Walker '99 has kindly sent the Secretary the following note taken from *Mining and Industrial News*: "Dan S. Johnson, 76, long identified with mining development in various mining districts of Nye county, Nev., died (September 9, 1949) in Nye county general hospital. Mr. Johnson was a graduate of M.I.T. and came to Nevada 45 years ago, as a United States mineral surveyor. Recently he had performed the engineering work on the Berlin property of the Phelps-Stokes interests." — ELBERT G. ALLEN, *Secretary*, 54 Bonad Road, West Newton 65, Mass.

## • 1904 •

Once in a while some member of the Class crawls out of his shell and sends an item of news about himself or some other

'04 man. This is always a help to your volunteer secretaries in making the class notes interesting. This time we are indebted to Frank Davis, I, of Detroit and we suggest that others follow his example. Frank states that his daughter attended a lecture in Lansing where the speaker was an oil man named Paine who was an M.I.T. graduate. It turns out that he was none other than our old friend Paul (Peacham) Paine of Tech Show fame. Frank enclosed a clipping from *Michigan Oil and Gas News* with more news about Paul which we quote: "Paul Paine, petroleum engineering consultant from California, will be the main speaker for the November 7th meeting of the Michigan Geological Society. . . .

Paine is presented at the Geological Society meeting under the auspices of the Distinguished Lecture Committee of the American Association of Petroleum Geologists. He is a highly respected petroleum engineer whose practice has been concerned chiefly with the valuation of oil properties and oil companies. He is author of the widely used text 'Oil Property Valuation.' Paine's lecture will be interesting not only to geologists, but also to production engineers, landmen and executives. His topic will be, of course, 'Valuation in the Oil Fields.' Frank also reports that last April he was on a vacation in Tryon, N.C., and as part of the evening entertainment at 1000 Pines Inn, some pictures were shown. The lecturer seemed familiar but it was a long time before he was correctly classified as Bill Eager who, with Mrs. Eager, are frequent guests at the Inn. Frank didn't say much about himself except that his principal hobby outside the oil business was roaming the north woods. He was about to leave for a deer hunt at the time of writing.

Under the title "Mr. Technicolor" the *Saturday Evening Post* of October 8 has published a feature article on Herb Kalmus which every '04 man should read. It gives a brief history of the trials and vicissitudes which colored motion pictures passed through before they were finally established and the part which Kalmus and Dan Comstock played in their development. Herb's biography is told briefly but it is long enough to show how persistence and ability make an unbeatable team. Congratulations, Herb!

The Reading, Mass., *Chronicle* records the retirement of Ed Parker as vice-president of the Middlesex County National Bank. The directors passed suitable resolutions which referred to his 45 years of service and expressed best wishes for the future. The following is quoted from the *Chronicle*: "After 45 years of service in the banking business, Mr. Parker feels it to be in his best interests to enjoy a period of reduced activity. Mr. Parker has been most active in town affairs for many years and is a descendant of the original settlers of Reading. He is a member of the Meadowbrook Golf Club, a past President of the Reading Rotary Club, Director of the Boosters' Club, and is now President of the Boston Guild for Hard of Hearing, which will largely occupy his time in the immediate future." Ed is a regular attendant at '04 gatherings

and the Class joins his fellow townsmen in their good wishes.

We can't seem to get by without at least one death notice in our class notes. This time it is Ad Holmes who became an assistant in the Mechanical Engineering Department at M.I.T. the year we graduated and was retired as emeritus associate professor in 1948. During the past year, he had been doing part time work under the title of honorary lecturer. Mrs. Holmes has the sympathy of the Class in her bereavement. — EUGENE H. RUSSELL, JR., 82 Devonshire Street, Boston, Mass. CARLE R. HAYWARD, Room 8-109, M.I.T., Cambridge 39, Mass.

## • 1906 •

That the Class may be accounted for in the first issue of the new decade, the Secretary reports that he is still on the job although the dearth of notes this month might seem to indicate otherwise. Usually a few clippings are received with the notice from The Review office, but this time no help came from that source. When in business, your reporter used to obtain an occasional item from the various telephone magazines and technical journals which came to his desk; but in the retired status, that news channel no longer exists.

Your Secretary did make a call on Fred Batchelder at his home at Hampton Beach in September and found him enjoying his retirement. He had just returned from a motor trip to Canada. — Your Secretary has played about 75 rounds of golf this year and probably at least 60 of them have been in a foursome which included Frank Benham. In this connection, it might be added that our game does not seem to be improving; on the other hand, it is consoling to think it is not deteriorating too rapidly.

The Secretary has enjoyed reading the notices from Henry Darling in regard to the Alumni Fund and bespeaks the class support for this worthy cause. When you read this, the 1950 drive will be on. This is the big year and let's do our utmost to give a record-breaking contribution in the 1950 drive. — JAMES W. KIDDER, *Secretary*, 215 Crosby Street, Arlington 74, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

## • 1907 •

This is one of those occasional months when I have very little news regarding our classmates to pass on to the readers of these notes. — Through the courtesy of C. A. Clarke, Secretary of the Class of 1921, I have a clipping from the Newark, N.J., *Evening News* of October 31, 1949, stating that Allan R. Cullimore of our Class, President Emeritus of Newark College of Engineering, was to address a meeting of the American Chemical Society at the Pacific Chemical Exposition at San Francisco on November 2. Allan was to deliver a professional paper on "The Most Desirable Characteristics" based on a survey he conducted for the Engineers' Council for Professional Development last year. The findings, which were re-

ported in a 25-page pamphlet, listed intelligence as the highest personal quality sought in engineering employees. Dependability rated second, with organizational acceptability, energy, emotional acceptability and physical acceptability following in that order.

On October 20, I received a card from John Frank that was mailed in Paris, France, on October 18. He wrote that he had spent a week in London, England, and that he was "doing the city" of Paris with Stud Leavell and his wife. — Everett Rich can now be reached by addressing R.F.D., Manchester Depot, Vt. I have no knowledge of just what he is doing but believe that he has retired from active professional life. — John H. Link, according to word received from the M.I.T. Alumni Office, is at 1107 West 6th Street, Marion, Ind. I have never heard from John directly since we graduated from the Institute, but I think that during the larger part of his life he has been a high school teacher.

During October and November I received several pieces of literature telling of the activities of the American Ordnance Association, Mills Building, Washington 6, D.C., of which our classmate, James L. Walsh, is president. This organization was founded in 1919 as the Army Ordnance Association and on the present letterheads is described as "A Membership Society of American Citizens Dedicated to Industrial Preparedness for the National Defense of the United States." Among other documents, Jimmy sent me a photostatic copy of a letter addressed to him written by the Honorable Louis Johnson, Secretary of Defense of the United States, congratulating him and the members of the Association on their cooperation in the solution of the ordnance problems of the Armed Forces.

As of October 31, 1949, 91 members of our Class, or 81 per cent of quota, had contributed to the M.I.T. Alumni Fund \$2,628 or 101 per cent of quota for the 1949-1950 Fund campaign. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. PHILIP B. WALKER, *Assistant Secretary*, 18 Summit Street, Whitinsville, Mass.

## • 1908 •

The first dinner meeting of the Class for the 1949-1950 season was held at Thompson's Spa's Club Grill Room on November 15, 1949, at 6:00 P.M. The following were present: Gorge Belcher, Joe Wattles, Leslie Ellis, Sam Hatch, Henry Sewell, Steve Lyon, Myron Davis, Linc Mayo, Jeff Beede and Nick Carter. Joe Wattles showed us some excellent Kodachromes taken on a recent trip through the Deep South to New Orleans, the Canal Zone and Guatemala.

We were sorry to learn from Howard Luther of the death of Joe Stewart, Jr. Joe was vice-president, general manager and director of the Cincinnati Street Railway Company. Funeral services were held on November 14. The following editorial in the *Times-Star* shows what Cincinnati thought of Joe: "Joe Stewart was a familiar figure around Cincinnati for the past quarter century. Although

many citizens may not have known him, he was the man who always popped up on the scene when something went wrong with the system or equipment of the Cincinnati Street Railway Company. Whether it was a fire, a traffic jam, a minor accident, or a flood, Joe Stewart, as general manager of the company, made it his personal business to try to straighten things out. A kindly man, stocky and with twinkling eyes that gave away his sense of humor, Joe Stewart was one of the nation's topranking transportation engineers and executives. He looked to the future and believed in progress for municipal transportation systems. A great deal of the credit for the tremendous strides in modernization which the Cincinnati Street Railway Company has made in recent years belongs to him. Besides all this, Joe Stewart was a citizen. He took an active interest in the community and its problems, and he belonged to clubs and organizations that are interested and active in civic progress. Joe Stewart made many friends and kept them. They and the city have lost a valuable fellow-Cincinnatian in his untimely death."

Please note the following address changes: Myron M. Davis, 64 Pine Plain Avenue, Wellesley, Mass.; Oliver S. Jennings, Post Office Box 341, 270 Pine Street, Fall River, Mass.; William H. Presson, Grange Avenue, Fair Haven, N.J.; C. Hamilton Preston, 120 East 19th Street, New York 3, N.Y.; George E. Tolman, 946 Ravine Road, Schenectady 10, N.Y. — The second dinner meeting of the Class will be held on January 10. Reply post cards will be mailed as usual. — H. LESTON CARTER, *Secretary*, 60 Battery-march Street, Boston, Mass.

## • 1909 •

This month we have received three newspaper clippings, each telling some story about a classmate. A notice in the Attleboro, Mass., *Republican* states that Marc Cole, II, 1 Westgate Road, had been appointed to the staff of the Barney Motors, Inc., an authorized Buick sales and service agency. Aside from a slightly higher forehead in his picture, Marc does not appear much different from the Marc we used to see and hear in the drawing room of Engineering B. He came to Attleboro from Lowell in 1942 where he was a screw machine and scale manufacturer. At the beginning of the War he was induced to come to Attleboro with his screw machine business, which enabled one of the local jewelry manufacturers to continue in business on war work. He is a 32d degree Mason, past member of the Rotary, director of the Young Men's Christian Association, and is active in civic and church affairs. — In a clipping from the *Dallas Times-Herald* it is stated that Ballard Burgher, I, is a director of the Texas Bank and Trust Company, and is best known for real estate developments which have marked Dallas' phenomenal growth during the past decade. In the fields of housing construction, property management and real estate development, he plays a dominant role. A native of Honey Grove, he holds

a B.A. degree from the University of Texas as well as a B.S. degree from the Institute. He is active in civic enterprises and is a member of the Dallas Park Board. A picture shows Ballard with a broad, happy smile.

The *Sunday Republican* of Springfield, Mass., states that Dwight Sleeper, VI, was the principal speaker at the first meeting of the Springfield chapter, National Association of Cost Accountants, held at the Hotel Sheraton last September. The subject of his talk was "How to Control Insurance Costs — 1949 Conditions." As many of us know, Dwight is chief accountant of the Insurance Buyers Council, his own organization. The company conducts insurance research, advice, supervision, audit, control and supervisory functions of insurance on a group basis for some 50 corporations. His photograph also shows a smile, not unlike that which he wore at the reunion. — In the September, 1949, number of the *Bell Laboratories Record* there is an article, "The 40 ACI Carrier Telegraph System," by Andrew L. Matte, VI, accompanied by his photograph. Since he is the author of the article, presumably Andrew is responsible for the development of the system. The article tells of the great economies attainable and states that the operating advantages of a carrier telegraph system over longer distances have resulted in its widespread use throughout the world. The method is something like radio in that each telegraph channel operates on some fixed high frequency; the different channels and their frequencies are scrambled, say, into two wires, and then unscrambled at the receiving end by tuning as we do with our radio sets. This new system developed by Andrew is more flexible and yet more self-contained than similar prior systems. After graduating, Andrew returned to the Institute in 1912-1913 for graduate work, and in 1918, after five years with the Detroit United Railways, joined the development and research department of the American Telephone and Telegraph Company and transferred to the Bell Laboratories in 1934. His specialty is carrier-telegraph systems and their co-ordination with the transmission characteristics of telephone and telegraph cables and circuits.

It is with deep regret that we report the passing of two well-known classmates, Alton Dickerman, III, on October 27, and Thorndike Martin, II, on October 24. Alton was suddenly taken ill while walking on a New York street during a trip to attend the convention at Atlantic City of the Fuel Merchants of New Jersey. He would have been 62 years old on December 9. He died at Saint Vincent Hospital. We all remember Alton well. He was a member of the Junior Prom Committee, Delta Kappa Epsilon Fraternity, vice-president of the Class in our sophomore year, and a member of the '09 relay team in the freshman and sophomore years. Many of us can still see him running desperately with the flag to help win the relay race which resulted in our winning Field Day in our sophomore year. Shortly after graduation, he went to Colorado Springs, returning to New



York to sign up for World War I in which he saw duty in France. For the past several years he had been advertising manager of *Fuel Digest* and made his home in Beverly and Marblehead. He was a member of several Masonic bodies and of Chaplain Lyman Post of the V.F.W., the Marblehead Legion Post, and the Marblehead Art Association. He leaves a widow and two sons, Richard W., and David H. Services were held in the Unitarian Church in Marblehead. — Thorndike was 64 years old and had just retired after having been employed by the Raytheon Company of Waltham, Mass., for eight years. He entered the Institute from Mechanics Arts High School. Many of us still remember him in that drawing room in Engineering B, his voice being pitched much higher than that of Marc Cole. He performed his thesis, "Experiments on Running Balance" with the late Bill Jones. He was associated many years with Waterhouse and Kimball of Connecticut, working on Diesel engine designs and during World War II joined the Raytheon Company. He leaves a wife Florence. Funeral services were held at the Wentworth Chapel, Waltham. — PAUL M. WISWALL, Secretary, 527 Belleville Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass. Assistant Secretaries: MAURICE R. SCHARFF, 285 Madison Avenue, New York, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

## • 1910 •

Returns from the request for dues and answers to the questionnaire for the reunion in June, 1950, presage the best turnout of the Class since the dinner at the American House in 1910. Cliff Hield, who is heading the arrangements for our 40th reunion is devoting much of his time to assure us of a wonderful time. Jack Babcock, Hal Billings and Hal Manson are handling the details in Boston and all are doing a remarkable job. When you read this you will already have received complete information as to the program, location and costs of this reunion. Up to the time of writing these notes, 37 classmates will attend and an equal number hope to attend the reunion. These are the first returns and both these classifications may be doubled. If you have not answered Cliff's questionnaire by the time you read these notes, please do so at once.

Hiram Beebe hopes to attend. He is secretary of the M.I.T. Club of Southern California which has 1,050 members. John Fitzwater, Dick Goodwin, Henry Harrison, Bill O'Hearn and Rad Preston are on the "will try" list. Larry Hemmenway says, "Nostalgia" for him; also plenty of Stite. Stite is a Minneapolis strong beer. He says that he guessed he was having too much fun at Technology, and the reunion, with some stimulant, should be a big success. Ralph George writes from Bradford, Pa., as follows: "I enclose a donation toward the reunion which I do not expect to attend for various reasons. However, I trust that a won-

derful time will be enjoyed by all who attend. I only attended Technology the last two years of the course and, as a result, my acquaintances were rather limited to members of Course VI. In accounts of former reunions I have noticed very few names of men I knew well. Circumstances diverted me from my Technology training to the oil business, in which I continued 'till about 10 years ago, when I retired because my health was not the best. For a number of years I was a director in the Bradford National Bank and during the War was vice-president, but have relinquished those positions. I feel very much out of touch with the Institute and seldom see any M.I.T. men. We spend most of our time right here, not having the Florida or California habit. This is a really beautiful part of Pennsylvania and the climate in summer is delightful. Again best wishes for a grand 40th reunion."

Andrew Fabens writes from Seattle as follows: "Will get to the 40th for sure. Don't let the above address confuse you. Am just visiting my daughter here. Expect to visit Henry C. Davis'11, VI, in Riverside, Calif., next week, then Ohio for Thanksgiving and Florida for Christmas." — Arthur Foote sent a short note from Florida: "I have retired from active work after many years in New York City working for contractors on subway construction. Now sojourning in Florida with expectations of making this my permanent home. Came down on February 1 of this year. The climate is ideal and all-year-round bathing in the Gulf is enjoyable."

Dud Clapp writes as follows: "I am still running the Deecy Products Company that I started 26 years ago. The character of the business changed during and after the War and our principal product is no longer textile oils but chemicals for plastics manufacturers. With Herb's help I have recently completed an addition to the plant, trebling our capacity, and have, so far, managed to keep the equipment running three shifts. All summer my wife and I spent what time we could in the cottage we built in Peterborough, N.H., in the Monadnock region. In the winter my extracurricular activities include directorship in the Cambridge Chamber of Commerce, the Cambridge Center for Adult Education, the Cambridge Dramatic Club and a few other club and church activities. I run into Charlie Almy and Dick Fernandez occasionally." — HERBERT S. CLEVERDON, Secretary, 120 Tremont Street, Boston 8, Mass.

## • 1911 •

Well, sir, we had two elevens at the annual "Seven Come '11" class dinner at Walker Memorial on the 7th evening of the 11th month — just 22 of us enjoyed a typically fine Bert Bridges dinner and then an unusually interesting talkaround, a summary of which follows, alphabetically. — Walter Allen, XIII, of the engineering department, A. C. Lawrence Leather Company, Peabody, reported that one of his daughters was married this summer to Robert L. Fowler, who is

with the Goodrich Tire and Rubber Company, Akron, Ohio. He added, quizzically, that he was convinced *The Father of the Bride* was more truth than fiction. There are now three granddaughters and one grandson in the Allen family. Walter also reported that Louis Harrigan, XI, for years with the Boston Transit Commission, has recently been appointed public works commissioner in Beverly, Mass. He also said he recently saw Hall Sargent, II, who retired from business earlier this year and is now mayor of Wormleysburg, a city in central Pennsylvania. — John Bowman, XI, structural engineer with the State Public Works Department, said he had been designing bridges since 1930 and hopes that the new bridge over the Annisquam River in Gloucester will soon be completed. He and his wife have two married daughters, who to date have presented them with four granddaughters and one grandson. He also called attention to an article by Dick Gould, XI, in the current 75th anniversary issue of the *Engineering News-Record*, concerning "Activated Sludge."

Because Batty and Clarke seem to go together like ham and eggs, we combine these two former partners in one paragraph. Ernest Batty, II, is still engineer and architect for the Lincoln Stores and he and his wife have one married daughter and one grandson. Obie Clark, II, said his Nelson Cement Company is having its best business to date this year. — Marshall Comstock, VI, continues with Wagner Electric Corporation, manufacturers of meters and transformers, reporting that there was practically no news with the Comstocks. — George Cumings, VI, continues with the New England Telephone and Telegraph Company in Boston and invited all hands to attend the open house of the new Franklin Street building which took place in November. — Dennie Denison, VI, has recently completed five years with the Gardner Chamber of Commerce and one new granddaughter has been added to the tribe of Denison; each of the sons now having a daughter, and Helen Elizabeth (Denison) Barton — who continues slowly but surely to recover from her mid-August polio attack — having two boys and a girl, seven, four and two-and-one-half years old. Dennie was elected president of the Massachusetts Association of Commercial Executives, for a one-year term starting October 1.

Tom Haines, II, one of a quartet of Boston Edison standbys present, has one married daughter in San Francisco and one in Philadelphia, with one grandson to date. Ned Hall, II, now a partner in the import-export firm of Hall and Vanderpoorten, gave us an interesting story of his four years' service with the United States Corps of Engineers during World War II; the last two of which he spent in Europe handling arms procurement. Although he said he didn't realize it at the time, he was really laying the ground work for what is turning out to be a very enjoyable and profitable business enterprise. The Halls now live in Newburyport, their present home having been built in 1812. They have two married



daughters and one married son; each daughter has a son and the son has two daughters. He was particularly glad, he said, to be present at a class dinner—for the first time in four years or more.

Hal Hallett, VI, says he is enjoying his work with the Port of Boston Authority very much and at present he is project engineer on the Mystic River work. The Halletts lost one son in the War, have another son who is a salesman for Devoe Reynolds Paint Company, covering New Hampshire and Vermont, is married and has one son, and a daughter who is living at home.—Stan Hartshorn, X, reported a letup in the demand for baby carriages at his C. H. Hartshorn, Inc., plant in Gardner, but added that his furniture business was still booming. Stan, Jr., who graduated from the University of Michigan last June, is back for a master's degree in business administration this year.—Jack Herlihy, II, Edison stalwart now in his 37th year there, said that just two days earlier Mr. and Mrs. Francis E. Kelly of North Quincy announced the engagement of their daughter, Marian S., to Richard C. Herlihy, second son of Mr. and Mrs. John A. Herlihy of Medford. Dick is an underwriter for American Mutual in Boston. Their older son is married and still in Chicago, while Jack said he and Mabel—who, we were glad to hear has enjoyed splendid health of late—are soon to visit their married daughter in Wilmington, Del., there to see for the first time their young grandson.

Hal Jenks, VI, told us some very interesting experiences he has been having of late with the New England Gas and Electric Association, in Cambridge. He has been doing some development on some high tension lines in and around New Bedford, one of them stretching to Provincetown. He reported that his married daughter, seriously injured in a fall downstairs in late December, has made a remarkable recovery. She has three youngsters.—Charlie Linehan, I, is still teaching mathematics at Rindge Technical School in Cambridge but is no longer coaching football; although he continues (now in his second decade) as secretary of the Massachusetts State Football Coaches Association. Charlie and his wife have one daughter in Belmont High School.—Uncle Roger Loud, VI, now in his 35th year with Boston Edison, is interested in the new building of the Boston Museum of Science (formerly the Natural History Museum beside old Rogers Building)—particularly in the new planetarium. His big son is still a mathematics professor at the University of Minnesota, is married and has one daughter; his younger son is a senior at M.I.T. in biophysics.—Morris Omansky, V, brought greetings from his daughter, Frieda (Mrs. Felix Cohen), who now has a son a little over a year old. Morris said he was less on production work and more on research and development work now.

Carl Richmond, I, says business continues to grow by leaps and bounds with his Factory Mutuals affiliate, Boston Manufacturers Mutual Fire Insurance Company. He showed the biggest age range among his youngsters of any of us:

Oldest boy a freshman at Harvard; middle boy in Winchester High School and youngest boy (six) now in the first grade.—Ralph Runels, I, of Lowell, attending a class dinner for the first time, was given a fine welcome. He lost his first wife in the late '30's and then lost his only son, an ensign in the Navy flying corps, in World War II. In late 1941 he was again married and now has three daughters and a son, with one of the daughters married. He still operates his own construction company in Lowell and has been and is quite busy. He reported that Sam Scribner, I, for many years supervisor of maintenance for the Boston and Maine Railroad, is now at home on Silver Street, Dover, N.H., almost completely paralyzed as a result of a spine shock suffered two years ago. He still maintains his courage and ready sense of humor, Ralph added, as he urged classmates to visit or write to Sam.

Bog Stevens, IV, continues with Stone and Webster. With his two sons now 10 and 5, respectively, he has become interested in Boy Scout work—and has been active in Cub work in Belmont, acting as baseball coach and manager for a pack there this summer.—O. W. Stewart, I, who retired as head of the inspection department, Associated Factory Mutuals, last spring, gave us a facetious discourse on finding things to do upon retirement. He paid particular tribute to the courage and foresightedness of the late Ted Van Tassel, X, who knew nearly three years before his death that he was doomed with cancer and offered himself to Harvard Medical School for arresting tests. O. W. concluded by saying he is now associated part time with Corporate Leaders Investment Trust.

Norman Wade, II, who completed the Boston Edison quartet present, has one married daughter who lives with her husband in New York City, and one single daughter who works with an insurance company in Hartford. Norman continues with the steam division of Boston Edison and told us of the labyrinth of steam pipes in the Boston area which B. E. supplies with steam for heating.—Emmons Whitcomb, X, told us of a fine trip to Mexico City from which he and Vivian had just returned. He is very happy back in the travel game with University Travel Company, Harvard Square, and gave us some interesting comments on the recent tragic air crashes involving commercial planes. Their son, Joe, is finishing his studies at Purdue University in February and is living off-campus with his wife.

During dinner the group rose in silent tribute to six classmates who have died in the past 12 months: Walter H. Hildebrand, I; Thomas F. McLaughlin, I; Ernest M. Symmes, V; Donald C. Bakewell, II; Edward D. Van Tassel, Jr., X; and Aaron L. Myers, XI, news of whose death had just been received.

Four classmates had expected to attend but at the last moment were unable to make it: Ambrose Gring, X; Charlie Maguire, I; Charlie McManus, I; and Aleck Yereance, I. President Don Stevens, II, wrote from Paterson, N.J., that he never seems to get to Boston any

more, while Vice-president Howard D. William's secretary, Ethel Neubauer, advised that he was in Europe at present and not expected back until late November. Fred Harrington, I, who rarely misses a class dinner, had to pass this one up on account of a recent illness; while Beardsley Lawrence, I, wrote from Lincoln: "Have not been out of bed for six months and am due to go to the hospital again."

A. L. Myers, XI, business and civic leader in Palestine, Texas, died on September 19 at a Palestine hospital following a lengthy illness. A native of Calvert, Texas, he prepared at Palestine High School and attended the University of Texas, before joining us in our junior year. While at M.I.T., he was active in the work of the Cosmopolitan Club, joined the staff of *The Tech* and rose to managing editor in his senior year, was secretary-treasurer of the Chess Club and a member of the Civil Engineering Society and the Biological Society. For the last 17 years he had been a partner with his brother, Harry I. Myers, in the mercantile business and also had served as city engineer for Palestine. Before joining the city administration, Myers was an engineer for Stone and Webster in Dallas for five years. He was a past president of the Palestine Rotary Club and Retail Merchants Association, a former Chamber of Commerce director, former vice-president and treasurer of the Associated Charities, a Knight Templar and a Shriner. Survivors include his mother, one married daughter and three brothers.

Since reporting the death of good old Ted Van Tassel, X, in last month's notes we have learned that he was a charter member of the Stoneham Rotary Club, an honorary member of the Cohasset Rotary Club, a member of the American Legion, Konohassett Lodge of Masons, Dane Street Congregational Church in Beverly and the men's club of that church. Also in addition to his wife and married daughter, Nancy, he is survived by three other married daughters, a son, William P., of West Newton and 11 grandchildren.

Through the thoughtfulness of Cac Clarke, Secretary of the Class of 1921, came word via a clipping from the Newark, N.J., *Evening News*, that Bill Orchard, XI, President of Wallace and Tiernan, Inc., Belleville, N.J., was given the Charles A. Emerson Award of the Federation of Sewage Work Associations at the unit's annual meeting on October 19 in Boston. He was honored in recognition of his work as a member of the federation's board of control and chairman of its finance committee. Bill was earlier made an honorary member of the group, being also an honorary member of the American Water Works Association and president of the Orange, N.J., Memorial Hospital. Our hearty congratulations, Bill!

Another fine correspondent, Selly Seligman, III, has sent me a number of reviews of General George Kenney's new book, *General Kenney Reports*, and all of them favorable. For instance, Gill Robb Wilson in his New York *Herald Tribune* column, "The Air World," said: "George Kenney, four-star Air Force gen-

eral, has no inhibitions and his typewriter has no semi-colons. These advantages accrue to make his new book an item for keen anticipation. . . . A New York Sun book review by Ray T. Morgan: "It is obvious as one reads Kenney's book that General MacArthur's esteem was merited. Any theater commander would have been lucky to have George Kenney in charge of his air war. . . . Like Chen-nault in China, Kenney had to be satisfied with what he could get. The reader will learn in this book the way in which the challenge of the situation was met." Fletcher Pratt in the New York Times: "Among books by the commanders of World War II, this one gets a high place — for fairness, for straightforward admission of inefficiencies when there were inefficiencies, for old-fashioned readability, for absence of the gripping tone in which so many other memoirs are couched. . . . Of course he is immensely aided by having one of the best success stories of the war to tell." Advice to all: Read *General Kenney Reports*. Selly reports, even at this early date, that he and Daisie "will sure try to make the '51 reunion" and that's good!

Northeastern University's corporation authorized President Carl S. Ell, XI, at its annual meeting on November 3, to make plans for erection of a library-classroom building in front of Science Hall on Huntington Avenue, Boston. He also mentioned two new land purchases: 170, 147 feet at the rear of Boston Opera House and the recent acquisition of the Tufts property. — Stan Hartshorn, X, and I met and talked with Jack Herlihy, II, and Tom Haines, II, at the annual meeting of the Associated Industries of Massachusetts at the Hotel Statler in Boston October 27.

On October 31, we had 133 subscribers to Alumni Fund X, to lead all classes with 110 per cent quota — exactly the same spot we held a year ago at this time; but this year our total was \$2,882 or 103 per cent (fifth place among the classes) — against \$2,782 a year ago. 1911, there she stands — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

## • 1912 •

It is with great regret that we note the death on September 24 of Charles L. Gabriel, X. No details have been received. Charlie had been for some time vice-president of Publicker Industries in Philadelphia.

Jim Cook reports having passed a pleasant evening with Ray Wilson at a Boston dinner of the Appalachian Mountain Club campers, who frequent Echo Lake on Mount Desert Island. Jim also reports seeing Harris E. Dexter, Vice-president in charge of commercial relations of the Central Hudson Gas and Electric Corporation, at the American Gas Association Convention in Chicago in October. Harris' son is now in his third year at high school where he has entered into athletics and is an expert swimmer. His daughter Carolyn, now 23, has grad-

uated from Saint Lawrence and is in charge of safekeeping of securities and safe deposit boxes for the First National Bank of Poughkeepsie. Frank W. Caldwell, Director of Research for United Aircraft Corporation, has been awarded the John Scott Medal for his development of the controllable pitch propeller. The *Marblehead Messenger* carried a full account of the wedding of Jim Cook's son, James A., Jr., to Nancy Gebow. Young Jim is a graduate of Phillips Andover and is now at M.I.T. During the War he served with the United States Marines.

Mrs. Cy Springall has the distinction of being the only non diabetic woman in the country to have been awarded the diabetic medal. Mrs. Springall is cited for her undying efforts in the promotion of two camps for diabetic children. She also has just been named president of the Association of Universalist Women, an organization with approximately 30, 000 members throughout the country. Mrs. Springall has devoted a great deal of time to camping for youngsters and is an authority on camps for the treatment of young diabetics. — C. D. Davis has retired from the Navy. He was stationed during the War at the Quonset Point Naval Air Station, with a rating of captain. He has purchased a 40-acre farm off Route I in Clinton, Conn., and hopes that anyone passing nearby will drop in on him. He is doing consulting work in industrial engineering.

Your Assistant Secretary, Lester White, is doing some work for the government, which I think he should explain more fully in the next letter. If he is in the F.B.I., we ought to be tipped off. — FREDERICK J. SHEPARD, JR., *Secretary*, 31 Chestnut Street, Boston, Mass. LESTER M. WHITE, *Assistant Secretary*, 4520 Lewiston Road, Niagara Falls, N.Y.

## • 1914 •

Happy New Year! With our 35th reunion just behind us, it hardly seems possible that we are already entering into another calendar year. This new year will see Alumni Day back on a Monday, June 12, at the Institute. It is hoped that a considerable number of '14 men may be able to be in Cambridge that day. — Another one of our classmates to give up the more strenuous life and take things a little easier is Dana Mayo. He has been with the Babcock and Wilcox Company in New York, but has recently decided to move to New Castle, N.H., where he has had a summer home for some time. Dana has not been in the most rugged health lately, and he feels that it is a great deal more sensible to be able to enjoy life from now on than to try to keep up the rigid routine of industrial life. As New Castle is just out of Portsmouth, Dana hopes that anyone passing along on the main route to Maine will stop by and see him.

Only a few months ago, we lost from the active members of our class Rear Admiral Tom Richey. At that time it was noted that Mrs. Richey was ill. She passed away on October 14. Many classmates will recall her great fame and the title

often applied to her as the "twentieth century Betsy Ross." Mrs. Richey had rejuvenated more than 2,000 battle scarred and time hallowed flags, among them being the original Star Spangled Banner and the Barbara Fritchie flag immortalized in Whittier's poem.

Professor Leicester Hamilton gave the featured talk on November 2 at the Fall Smoker of the M.I.T. Club of New York. His subject was, "The Chemistry of Dorm Life" or "What Makes an Undergraduate Tick." Your Secretary has heard Leicester talk on numerous occasions and is certain that he did a fine job. The management of dormitory life has always been a headache in colleges, but Leicester, who was formerly chairman of the Dormitory Board and is at present on the Advisory Committee on Dining and Housing Facilities, has established a very high standard at the Institute. Letting the boys govern themselves but at the same time keeping a strict eye on them has required a very careful balance which has won for Hamilton the highest respect of both students and faculty.

The merchandiser of our Class, Charlie Hull, is another who has left city life for the country, but not in retirement. For 29 years, Charlie was a buyer for the famous Raymond's store in Boston. He felt that he would like to get into another store with less strenuous activity where he might be able to continue without regard for actual retirement age. He, therefore, has joined with an organization at Henniker, N.H., and from the listing of items carried by his store it is truly an old-fashioned country store, cracker barrel and all. Charlie says that Henniker is only 18 miles west of Concord and 28 miles north of Manchester, so that if any classmates are on their way to the New Hampshire vacation region, he would like to have them stop by. — H. B. RICHMOND, *Secretary*, 275 Massachusetts Avenue, Cambridge 39, Mass. ROSS H. DICKSON, *Assistant Secretary*, 126 Morristown Road, Elizabeth 3, N.J.

## • 1915 •

Happy Holiday to all classmates — this year and every year. The big news is that our 35th reunion will be held June 9 to June 11, 1950, at Coonamessett Ranch, Falmouth (on Cape Cod), Mass. With Alumni Day coming on Monday, June 12, this will give you all a chance to come to your reunion and then go on up to Boston on Monday to visit M.I.T. and attend the Stein-on-the-Table Alumni Dinner at the Copley Plaza Hotel, Boston, Monday evening, June 12. Our reunion at Coonamessett is stag but there will be a monster cocktail party for all class ladies on Monday afternoon at the Copley Plaza just before the Alumni Dinner. This cocktail party is under the direction of Barbara and Virginia Thomas, and Wally Pike. This able and attractive committee (yes, we mean Wally, too) assures the class ladies a gay party. Mark your calendars now and plan to be there with your other classmates. Class dinners in New York on December 2 (report in detail next month) and in



Boston on October 21, settled the plans. Max Woythaler and Weare Howlett did a grand job, entailing a load of work making arrangements. Many thanks to them. Other committees and sectional key men have been appointed to assure the howling success of this party. Do your part—be there! Situated 75 miles from Boston, Coonamessett Ranch is located on historic Cape Cod. Its rolling acres of green country provide an excellent 18-hole golf course (6250 yards, with par much lower than most of us shoot), tennis, riding, and bathing. Informal dress at all times permits complete relaxation. Attractive cottages will be available for fraternity delegations or business associates. All meals, however, are served at the main lodge. On your marks—set—go—to your 35th class reunion!

Congratulations to Ralph D. Waterman who recently was appointed executive vice-president of E. B. Badger and Sons Company, Boston. With his order for M.I.T. glasses, Peter Masucci, 233 Amosland Road, Norwood, Pa., says: "Thanksgiving and Christmas will soon be here. I am looking forward to dispensing some 'good cheer' in glasses with the M.I.T. insignia."—If any one of you has a 1915 or 1916 *Technique* you'd like to sell me for a classmate who is anxious to replace his lost one, just let me know and I'll send you a check. Look around, maybe you can help me.—Jim Tobey always writes an interesting letter as he gets into the "grandpappy" competition: "During the week of October 24 I attended all the meetings of the American Public Health Association in New York City. We had an M.I.T. Alumni breakfast on October 25, but the only '15 man present was Martin W. Cowles, who is still running the Hackensack, N.J., water supply. Ellis Tisdale, now with U.S.P.H.S. in Atlanta, Ga., was on the program of one of the sessions, but I did not see him. We are expecting another grandchild early in December and my wife will spend a couple of weeks with our daughter at Petersham, N.H., at the time. I may take the opportunity, if all goes well, to run on to Boston from Petersham and, if so, shall hope to see you. In the meantime, come up and see me sometime."

At a Development Committee dinner in San Francisco in October, Jack Dalton said that the five '15 men present represented the largest group from any class. He was pleased to see and be with these other classmates: Henning J. Berg, Walter H. Brown, Bill Campbell and Robert P. Sherman. Bill and Jack, of course, are from M.I.T., but the other three were all from San Francisco.—Here endeth the column. Lift up your countenances unto me—and "help Azel."—AZEL W. MACK, Secretary, 40 St. Paul Street, Brookline 46, Mass.

## • 1916 •

Happy New Year and a sincere wish that everybody has had a happy holiday season. Our November 8 luncheon in Boston was our most successful of the year, and we hope to have more like them.

Guest of honor was Herb Gilkey from Ames, Iowa, in town for a series of meetings with the American Concrete Institute of which Herb is president. There to meet him were Tom Berrigan, Harold Russell, Charlie Foote, Jack Hickey and his son Edward, currently of M.I.T., Joe Minevitch, Horace Burnham, Steve Berke, Bob Crosby, Earl Townsend, and your Secretary. They placed us out in the main club dining room instead of our usual nook back away from the madding crowd, but, nonetheless, if we shouted loud enough, everybody heard everybody else. Herb admitted that this was the first class gathering he had attended since graduation, which is a terrible admission, Herb, what with so many wonderful reunions having come and gone. Herb said he'd try to make the 35th, but could give no assurances. Most of us had a nice talk with him at one time or another and found out that his name has been carved in the world in more ways than one. He informs us that he was a member of a special advisory committee which helped plan Hoover Dam and his name rests on a plaque on said dam where all who come may see. There was so much said and discussed at this luncheon that we find it impossible to report much more, except that we brought up the problem of the 35th reunion. It is going to be January, 1950, when you read this column, and in a matter of a few short months said quinquennial gathering will be upon us. If anybody has any bright ideas as to programming, entertainment, and so on, send them to Bill Farthing, Harold Dodge, or myself, and we'll pool our resources. We are trying already to get a reservation at some good spot and have encountered other reunions getting the jump on us. We can't get going too soon, so let us have your ideas.

At two of our previous meetings, Al Giles proposed a plan for keeping the Class as populous as possible for the next several years; and I believe we mentioned this in our last column but could not pursue it for lack of space. It seems that the Class of 1900 of the Harvard School of Physicians and Surgeons became alarmed at the high mortality among its members and, upon a resolution presented by one of their members, set out to find out how to stop this increasing rate. A panel of experts was chosen, and a questionnaire was composed and sent to all members, asking them to state frankly their present physical condition. The panel then reviewed the questionnaires returned, sent back diagnoses and suggested treatments, and the results amazed everyone. The life expectancy of the class as a whole was actually increased and the general health of all was markedly improved. Al thinks it would be a good idea for 1916 to enter into something of the sort. We should have a good doctor or two among us who could volunteer a little assistance. Any volunteers? Let's have your ideas.

Vannevar Bush has been making headlines recently. As chairman of the Office of Scientific Research and Development during the War, he was "chief of staff" for American science and received the

1949 medal of the Industrial Research Institute. The citation he received with this read: "... for his leadership in the Office of Scientific Research and Development, in marshalling industrial and academic research and co-ordinating it with the military effort in the common defense, developing an instrument of government so effective as to provide a pattern for continued service." I imagine most of us have noticed his article in the November 14 issue of *Life*, which had to do with some of his views on the possible future of warfare in the face of present scientific development. In November the New York *Herald Tribune* carried a highly praiseworthy review of his new book on this subject, *Modern Arms and Free Men*, and the November 21 issue of *Time* gave it considerable coverage. General Omar Bradley broke a long-time self-imposed restriction against commenting on new books in a telegram to the *Herald Tribune* in which he said: "I believe that *Modern Arms and Free Men* fills a much needed lack in our viewpoint toward possible war and probable peace. Seldom before has science offered so much assurance and hope that in preparedness and steadfastness lie our best hopes for peace."

We received a long and interesting letter from Bob Miller of Pittsburgh. We saw him during the convocation last spring but now have a complete history of his past and present which we will pass on to you. Bob was with the H. K. Mulford Pharmaceutical Chemists Company in Philadelphia for a year before he became a shavetail in World War I at Camp Upton, N.Y. He did not get overseas but "fought the battle of Port Newark Bay with mosquitoes as the principal enemy from February, 1918, until February, 1919, when I was discharged." After marrying Edith Hall Hotchkiss in New Haven, Conn., in June, 1918, Bob made the rounds of several firms until he finally settled for the Pittsburgh Plate Glass Company in December, 1921. "During my tour of duty with the company, I have been in charge of the flat-drawn, sheet glass development work. In 1930, I was transferred to the Pittsburgh office as technical sales engineer and have occupied that position ever since. During this period, I have been directly connected with the development of various products including X-ray lead glass, tempered glass doors, the development of the glass used and its sale to the National Gallery of Art at Washington for the lay lights in all of the galleries, double-glazed units which the company calls 'Twindow,' the heat-absorbing glass 'Solex' and several other similar items. Since the very early '30's, I have been active with the American Standards Association in the formulation of the 'American Standard Safety Code for Glass for Glazing Motor Vehicles Operating on the Land Highways' and have been active in the revision of that code, which should be promulgated within the next two or three months." Bob has three sons, Robert, Frederick and Richard. The first two graduated from Yale in 1942 and 1949, respectively, and both served in the Armed Forces.



Richard is now in St. Paul's in Concord, N.H. Thanks for your wonderful letter, Bob, and it should serve as inspiration to a few hundred other classmates who have, so far, fought shy of revealing any of their past.

We were very glad to hear from Mark Lemmon about some of the really big things going on down in Dallas. He writes: "We are enjoying a splendid practice here in the Southwest which, I suppose, is more active in the construction business than any other section of the country, due to so many of your eastern concerns establishing themselves here. Although I have not set myself up as a specialist in any type of architectural work, our largest practice has been in the design of educational plants. Presently, we are the architects for Southern Methodist University and have 10 buildings under construction on the campus involving a construction cost of \$7,000,000. I am consulting architect for the board of education of the city of Dallas. We are also consulting architects for the University of Texas at Austin, which is in the midst of a program involving some 10 buildings at Austin and at the medical branch at Galveston." Mark closes by stating that he feels nothing of his private life would be of interest to classmates of so long ago (you're wrong there, Mark) but does say: "I am happy and thankful that our friends are so kind to us and thankful that after so many years I am able to be active in my profession."

We have a letter from Bill Dodge on a letterhead that says: "William Waldo Dodge, Jr., Architect, Asheville, North Carolina." Bill says that the most important thing that has happened to him is that he has become a grandfather. He points out that architectural work has been spotty, but that if certain projected work comes through, he will be extremely busy. He has been doing some mechanical development work which is still speculative but has considerable promise. He says that while a number of M.I.T. engineers are in his neighborhood, he hasn't seen any 1916 members for a long time.

We've all heard of the promise held out for the recently announced new treatment of arthritis, and we're glad to hear first hand about this from Joe Barker, who, as president of Research Corporation, has been close to the development. Joe writes: "Procrastination certainly is one of my traits—your letter asking for something for the class notes came while I was on a trip to the West Coast, got toward the bottom of the pile on my desk and then stayed there. Each time I worked down to it, I put it a bit farther down because I couldn't think of anything really interesting of a personal nature. I still can't, but having started on my annual report to our board of directors, it occurred to me that some of our classmates might be interested in the story behind one of the researches supported by our Corporation. It is an example of the tremendous joy I have in my job. Many years ago we gave to a chemist at the Mayo Clinic in Rochester, Minn., a research grant to permit him to study the hormones secreted by the

adrenal cortex (the shell-like covering of the adrenal glands). This study led to the preparation of a very complex chemical—now known as Cortisone or Compound E. The initial starting material is ox bile or one of its derivatives, desoxycholic acid and at present proceeds by some 35 steps to the final product. As many have read in *Life* or the *Saturday Evening Post* or in their local newspapers, this Cortisone has had truly spectacular results in the alleviation of rheumatoid arthritis. More recently some other degenerative diseases and even some cases of cancer have been helped by this product. To be permitted to have even a slight part in this attack upon a terrible affliction of humanity is one of the great joys of my job. I've never had so much fun in my life—every day's work is a genuine pleasure—and whenever I read a report of progress of any of these researches, I get a new thrill."

Have you ever thought of going back to school again? If so, you need no longer hesitate, for Jap Carr has taken the bit in his teeth and can be used as a 1916 precedent. He is in Cambridge, too; not at Radcliffe, not at Technology but—here, you read what he says: "Surprise—Surprise! Here I am up at Cambridge studying at Harvard, of all institutions. Am taking the advanced management course given for 12 weeks to older men in business. Just started less than a week ago but it all looks very interesting. Out of 143 men, nine are M.I.T. men. Columbia also has nine alumni taking the course; no other college or university has that many. Last winter I was pretty well worn out and spent three months in Florida. They were very enjoyable and I played a great deal of tennis and did very little work. I have my wife with me; one of the old Stuart Club girls who is back to study oil painting. Our youngest boy is with us and attending Brown and Nichols School. We have a small furnished apartment in Cambridge and are expecting to have a fine time getting acquainted with Boston again. I am working on the Technology financial matter, like many of us, but for the next three months am out of action on it. This summer I won the men's doubles tennis championship at Buck Hill Falls in the Poconos, which is not so much except that it is well known that I am 55 years old. Bill Tilden won that tournament on the way up—I had to do it on the way down. This should constitute a warning to tennis-playing classmates to be ready for action at our 35th reunion in 1951. With best personal regards and greetings to all the Class."

Because of space limitations, we will have to put off some very interesting letters until next time, including one from Ernie Gagnon in South America, Carlin Harrington in Grosse Ile, Mich., and Phil Brooks from Stratham, N.H. Only one question: Who knows where Willard R. Crandall holds out? Our letters to him keep coming back after traveling all over the city of New York. Don't forget now—if you are in Boston on the second Tuesday of any month, drop in to see us at Thompson's Spa on Washington Street around 12:30. And keep the

letters coming.—RALPH A. FLETCHER, Secretary, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, Assistant Secretary, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

## • 1917 •

Ray Blanchard attended a meeting of the M.I.T. Committee on Financing Development in New York in November and sat next to Joe Littlefield. He also saw Win McNeill at the meeting, as well as other '17 men.—Art Knight writes from Scranton that "on October 3d, Lobdell was here at a meeting to which we brought together about 15 Alumni, representing a very large proportion of our small Alumni delegation. Bill Dennen of 1917 and Adrian Ross of 1934 have been our local Honorary Secretaries for some time and the purpose of Lobby's visit was to explain to other members the function of an Honorary Secretary, and to tell us something about the students problem at M.I.T. and the growing need for more careful screening of applicants for admission. Not being an Honorary Secretary, I had a small part in the proceedings but was very glad to be able to play the part of host in arranging for a dinner at the Scranton Club preceding Lobby's talk. We all enjoyed his visit."

The Wentworth Institute and the National Association of Manufacturers recently sponsored a seminar on "What Inventions Mean to You" with Dick Loengard as presiding officer of the panel forum. Dick is president of United Chromium, Inc., in New York.—We take pride in the appointment of Vice Admiral Forrest P. Sherman to head United States Naval Operations. He was a member of the Class for a year previous to his appointment to Annapolis in 1914. His rise in the Navy to his present position of highest responsibility has been a rapid and well deserved one.

The United States Senate confirmed in October the appointment of Louis W. Perkins as rear admiral in the United States Coast Guard. Admiral Perkins is also a former 1917 man, having spent his freshman year at the Institute, and has attained the highest post in the United States Coast Guard after a career devoted entirely to Coast Guard work. He took part in the first ice patrol in the North Atlantic and Labrador following World War I, and his duties during World War II were divided between amphibious training work and combat.—Ted Bernard has received cordial communications from President Killian and Dr. Compton to whom he sent copies of Progress Report No. 2 on the Class of 1917 gift. President Killian wrote that he found it a "most impressive accomplishment" and that he was "delighted to see the plan working out so well." Dr. Compton sent "Congratulations to you and your classmates on a well-planned and well-executed job!"

Addenda and errata . . . November class notes: Art Knight writes us that he read the list of those attending the Alumni Dinner in June and found no mention of the presence of "the illustrious

Ex-President of the Alumni Association, Ray Blanchard, or the writer, who sat next to Ray and spent considerable time talking to him about the coming capital fund campaign." It must have been the glitter of the dollars discussed that bedazzled your Secretary. — **RAYMOND STEVENS, Secretary**, 30 Memorial Drive, Cambridge 42, Mass. **FREDERICK BERNARD, Assistant Secretary**, 24 Federal Street, Boston 10, Mass.

## • 1918 •

About now David Rubin should be getting back from Europe whither he went in late September, accompanied by his wife, for a three months' pleasure trip. One cannot be sure whether or not to class this as sabbatical. Be that as it may, Dave, who studied Civil Engineering to the point of doing a thesis on the strength of miniature skewed arches, is now an instructor in Mechanics Art High School in Boston. He has visited England, France, Holland, Switzerland, and Italy. The plan was to fly from there for a month in Israel. Son Eugene works for the Division of Industrial Cooperation at M.I.T., and daughter Lucille is an Associated Press reporter in Albany, N.Y.

Franklin van Zelm, who even 35 years ago loved cartooning more than he loved calculus or even the architecture he studied for three years before joining the Armed Forces in World War I and eventually having 800 people under him, got a big spread on page one of the *Lewiston, Maine, Journal* last October. Van lives in Harrison, Maine, the year round, in a house that looks like a hotel with a two-deck porch which requires 12 pillars to span its length on the south side. It is called Summit Spring Manor and overlooks the White Mountains across the border of New Hampshire. After World War I, Van went into animated cartooning with a staff of two. In those days the process used was far different from that of today. Cutouts were employed. These were jointed at the knees, elbows, neck and so on. They were moved against a black background. The majority of the films made were sent to South America. From this work, Van secured employment with the Bell Syndicate. Later he went to King Features, working there in collaboration with J. B. McEvoy, who gained considerable acclaim as a playwright. The two collaborated on a comic strip and a Sunday page; Mr. McEvoy doing the writing and Van handling the drawing. He also worked for a time with the George Matthew Adams Syndicate.

Finding that his eyes were bothering him, he left this field and went into the real estate business in Westchester County. Unquestionably, his secondary interest in architecture led him to enter this business. It proved most profitable until the stock market crash turned real estate upside down. Van thus returned to cartooning. He worked independently for a number of years and then, in 1941, joined the staff of the *Christian Science Monitor*. By 1936, he was the owner of Summit Spring Manor in Harrison and living in Maine quickly had won him over to living in the country. As he ex-

pressed it, "I didn't like the confinement entailed in working in an office, so I resigned and moved to Harrison where I have lived ever since." He did a number of the *Monitor's* editorial cartoons and in recent years his special Vangnome series of cartoons have appeared daily.

Desiring a feature for children, Globe Syndicate asked him to submit samples. Among the type of cartoons submitted by him were some based on Biblical quotations. Globe took these, which possess as much appeal for adults as for youngsters, and the "It's Just as True Today" series was launched. Thirty-five or forty newspapers subscribe to this syndicated feature, including publications in Boston, Buffalo, Cincinnati, Philadelphia, Nashville, Bridgeport, Scranton and Birmingham, to name but a few. "The Vangnome strip and 'It's Just as True Today' really keep me busy," Van said, "I have to space my work each day, for my eyes get tired. Usually I commence working around noon, but the bulk of my cartooning is done in the late hours of the night or the early morning hours. I find I can get more done then. There are no interruptions during this period." — **GRETCHEN A. PALMER, Secretary**, The Thomas School, The Wilson Road, Rowayton, Conn.

## • 1919 •

Mail was received from Bess Sindler Fichter who writes that she is doing nothing more exciting than filling the role of a part-time medical secretary. — Had a card from L. A. Gillett who writes: "Trying to keep the plant in first-class shape on a coal hauling railroad. The coal business as it has been during 1949 is a problem which requires considerable ingenuity. In spite of that, I have managed to rehabilitate our main generating station (we are partially electric, you know) relined several tunnels with concrete, and generally keep my head above water. Hope to attend a class reunion in the near future and get reacquainted." Heard from J. G. Fleckenstein who writes that his older daughter Joan is back at M.I.T. His younger daughter Jacqueline is attending the University of Kentucky at Lexington, Ky., studying Mining Engineering, but she, too, wants to transfer to M.I.T. next year.

Lou Grayson writes: "My life continues in the same busy strain. I'm still spending most of my time in estate and insurance planning, and having a little fun on the side. Thanks to Marilyn — now four-and-one-half years old — our travels have been rather circumscribed the past few years. But we're gradually beginning to stretch out again, and soon hope to be able once more to go places. Life in Washington has a rather fast tempo, and certainly is never dull or prosaic." — Received the following card from F. J. Given: "As you know, I manage to keep quite busy with my two major occupations: 1. Assistant Director of transmission apparatus development at Bell Laboratories; 2. Chairman of panel on electronic components of the Research and Development Board of the National Military Establishment. Just now am do-

ing an extra chore — soliciting for the M.I.T. Development Program. Last week, I attended a dinner in Newark where Dr. Killian told us of the plans. The Class was represented at the meeting by Way, Langille and myself."

C. J. Farist writes that he took six weeks off this summer and went out to the West Coast and Canadian Rockies with his wife and daughter. His daughter is a junior at Radcliffe. — The *New York Herald Tribune* of October 11 carried a story on the marriage of Mrs. Elizabeth-Anne Warren Thompson to Donald Albert Washburn. The wedding took place in Pinehurst at "The Casements," winter home of the bride's parents. Mrs. Washburn attended Miss Porter's School at Farmington, Conn., and attended Technology. Mr. and Mrs. Washburn are living in Pomfret, Conn.

J. Pickering Putnam has moved from Boston to 26 Spruce Street, Watertown 72, Mass. James P. Thurber is with the New England Telephone and Telegraph Company at 185 Franklin Street, Room 1209, Boston 10, Mass. William J. Hagen, Jr., has moved from Knoxville, Tenn., to Chattanooga, Tenn. — **EUGENE R. SMOLEY, Secretary**, The Lummus Company, 420 Lexington Avenue, New York, N.Y. **ALAN G. RICHARDS, Assistant Secretary**, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

## • 1921 •

As we pass the mid-century mark, interest continues to center on the second generation of 1921 at Technology. At this writing, our data may not be complete and corrections will be welcomed. However, information furnished through the courtesy of the Registrar's Office and the Review Staff shows the admission of three new students to compensate for the three seniors who were graduated this year. Nelson C. Lees, a freshman, is the son of Mal Lees'20 and Connie (Nelson) Lees of our Class. Edward H. Schwarz is the son of Professor Edward R. Schwarz, Head of the Textile Technology section of the Institute's Department of Mechanical Engineering. Allen L. Cudworth, a graduate student in Electrical Engineering, is the son of Jim Cudworth, Dean of the College of Engineering, University of Alabama. Others at Technology include: Seniors — Frederick W. Adams, Jr., John E. Bent, Herbert C. DeStaeble, Jr., William B. McGorum, Jr., and Stephen H. Senzer; Juniors — John M. Lee, Francis B. McKee and Wilfred H. St. Laurent, Jr., a nephew of Ray St. Laurent; Sophomores — William C. Church, Edward C. Facey, Richard F. Jenney, Robert M. Lurie, John B. Mattson, Jr., Arthur H. Schein and Paul G. Wetherbee. Jenney and Lurie have achieved exceptionally high scholastic honors and are on the Dean's List.

At a recent meeting of the M.I.T. Club of Northern New Jersey, Mor Aronson, Max Goldberg and Fred Kowarsky took an active part. A large number of the New York contingent of the Class were present at the Development Program banquet at the Starlight Roof of the



Waldorf Astoria. A partial listing includes: Allen Addicks, Tony Anable, Carl Cohen, Zam Giddens, Dan Harvey, Joe Hauber, Irv Jakobson, Warrie Norton, Clyde Norton, Larry Richardson, Jack Whipple, Dick Windisch and your Secretary. Bill Rose is active in the top echelon of the New Jersey division, Tony Anable is on the public information committee, Bill Sherry of Tulsa is cochairman in his region and Ed Farrand is a member of the planning group in Chicago. Other district and committee chairmen include Jack Barriger, Charlie Herty, Whit Spaulding, Glenn Fargo, Harrison Mosher and Glenn Stanton. Active on various committees are Jack Facey, Chet Knight, Fred Rowell and Gene Rudow.

Sanford J. Hill comes up with the secretarial committee report of the month. Writing from Wilmington, Del., where he is in the legal department of Du Pont, San says: "I had a very pleasant trip to the West Coast in July and did manage to see one member of our Class. Spent an evening with Earl McBroom in Sacramento, Calif., and found it all too short to cover the intervening 28 years. Mac is engaged in construction work for the state. He has two children, one in high school and one in college. Few of the Class get to Sacramento and Mac would be glad to see anyone who does pass that way. Harry H. Fisk '22, a lieutenant colonel, has recently been assigned to duty in Wilmington after a three-year stay in Germany. I believe he was originally in the Class of 1921 as he was in Tech Show with me in 1918. He, too, has two children, a boy in college and a girl in the senior year in high school. Harry and I attended a recent meeting of the M.I.T. Club of Philadelphia at which our classmate, Jack Barriger, spoke on his favorite subject, 'Railroads,' and supplied the crowd with literature concerning 'The Monon,' of which he is president."

A most welcome letter arrived from Professor Jim Cudworth, Dean of the College of Engineering of the University of Alabama. Writes Jim: "The spirit moves me to write after several years of silence. Perhaps as one grows older one reminisces more over the past or perhaps the pressure at the University has lessened and there is a little more time to tend to these things. My wife and I spent a few weeks north this past summer. I visited the Institute with the result that we have three more Technology men on the faculty here. This gives us a total of eight, which is a sizable group. Our youngest son, Allen Latham Cudworth, entered M.I.T. in September in the acoustic laboratory. He is the third generation of my family to go to Technology and we are naturally proud to have him there. I recently attended the meetings of the A.I.M.E. at Columbus, Ohio, where I presided at a technical session. Also attending the meeting were Joe Gillson, a geologist with Du Pont, and Dick Smith, assistant manager of the National Resources Department of the United States Chamber of Commerce. I am a representative of the A.I.M.E. on the Engineers' Council for Professional Development.

We are off the beaten track, but the latchstring is out for any members of the Class who get into the 'Deep South.'"

Scanning the papers after the Washington Airport disaster, we were shocked to see the names of "Mr. and Mrs. R. F. Miller" listed among the fatalities and it is good to have confirmation from Rochester that our Bob and Helen were not involved. Bob writes that they haven't flown since their honeymoon trip through Europe in the early 30's and he is an infrequent air traveler. He is continuing his consulting work in New York State, currently on forgings, metal furniture, stampings, refrigerated food display units and pole line hardware.

Alumni Secretary Donald Severance '38 has circulated a letter with the names of all Alumni known to have given their lives in the service of the allied forces in World War II. These names appear on page i of this issue of *The Review*. The five listed from our Class are Howard R. Healy, Alfred J. Lyon, David A. Newcomer, Fred L. Raymond and Carl W. Starck. Please advise your Secretary if you know of additions to this list. Every attempt is being made to have the list as complete and accurate as possible for Technology's permanent War Memorial in the main lobby of Building 10 for which the Class of 1921 agreed to provide funds. It is hoped that every member of the Class will participate. Additional contributions are needed and should be sent direct to Zambry P. Giddens or mailed in care of your Secretary.

Some 150,000 words appeared in the class notes section of *The Review* last year and are not to be compared to *Gone With The Wind* in either length or content, quips the infant publication of the Alumni Association, the *M.I.T. News Letter*, which is not to be compared to tabloids of the same stripe either in freshness or features. As a matter of fact, we still need news. How about a letter after all these years?—CAROLE A. CLARKE, Secretary, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

## • 1922 •

Ken Sutherland, President of the Sutherland-Abbott advertising agency in Boston, was one of two speakers at the second in the series of eight Small Business clinics at the Rutland, Vt., Free Library on October 13. The topic under consideration was "Who Are Your Customers?" "Voices from Amsterdam" was the subject of Dr. Lester Lewis of the Brocton Unitarian Church when he spoke at the First Parish Church on October 19. The subject under discussion was the happenings at the meeting of the International Association of Liberal Christians and Religious Freedom which was held last summer in Amsterdam.—Ed Terkelsen, Treasurer of the Terkelsen Machine Company of Boston, who has been a resident of Newton since 1916, was elected alderman in the elections held on November 8. Ed has been active in municipal affairs for a long time past, being for some years chairman of the All-Newton Halloween parties, which

have been so successful in rendering Halloween less of a worry for householders by collecting all of the children at a large number of city-wide parties.

Leon K. Biganess, for 20 years a prominent piano teacher in Arlington and Boston, has opened a new studio in Arlington. Biganess gave up his engineering for a career in music. He was a pupil of the renowned composer-pianist-organist Arthur Foote, and has appeared in many recitals. At present he is also organist-director of the West Somerville Church, where for the last five years he has directed a children's choir, an adult choir and a quartet of soloists.—A. F. Robertson, back from the wilds of Canada, called on your Secretary in November. Slim's prospecting in Canada was carried on near Sutton Lake which is near the south shore of Hudson Bay. He was there alone over the winter of 1948-1949 living an almost incredible existence. If there are any writers in the Class who would like to have some authentic material for a good story, your Secretary suggests that a conversation with Robertson might be enlightening.

Members of the Class are, as usual, active in the affairs of the Alumni Association and the Alumni Council as the following list will indicate: Executive Committee: Parke D. Appel; Members at Large of the National Nominating Committee: Minot R. Edwards, John S. Williams, Jr.; Class Representative: A. Robert Tonon; Representatives of local clubs: Atlanta, Warren T. Ferguson; Havana, Earl H. Eacker; New York City, Dale D. Spoor; Pittsburgh, Thomas E. Shepherd; Salt Lake City, Parke D. Appel; Schenectady, Karl L. Wildes; Alternate Representative, Oscar H. Horovitz.—Conrad E. Ronneberg, S.M., 1922, Ph.D., University of Chicago, 1935, is starting his fourth year as chairman of the Department of Chemistry, Denison University. During the past summer, he served as visiting instructor in Nuclear Physics in the Chemical Corps School, Army Chemical Center. In addition to teaching, he revised the text used in the courses in radiological defense for the National Military Establishment.—C. YARDLEY CHITTICK, Secretary, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, Assistant Secretary, 333 Elliott Street, Buffalo 3, N.Y.

## • 1923 •

The Institute has a new officer known as the Provost and Julius A. Stratton, Professor of Physics, has been appointed to it. The Institute now has a number of deans and the best explanation I can give as to Professor Stratton's office is that he is expected, somehow, to keep the various deans in line. This may, however, be an incomplete explanation of his duties and perhaps a bit flip, but it will give you some idea of how complicated the educational and administrative organization at the Institute has become.

Many of us at the 25th reunion were disappointed because no one seemed to be able to turn up a documentary film, prepared by the Class, showing our graduation and also some shots from the



inauguration of former President Samuel W. Stratton. I am pleased to report that Alumni Secretary Don Severence '38 has been trying to find such films and turned up this one. The Alumni Association is arranging with the M.I.T. Photographic Service to properly store this film. Would any member of the Class like to volunteer to serve as a class functionary responsible for knowing at all times where various films and film fragments are which are of interest to the Class? I would like to get someone to undertake this assignment with the idea of having prepared a carefully edited set of films on 16 millimeter stock for showing at the 30th and, perhaps, at subsequent reunions.

Philip L. Riley normally uses a Washington address, although much of his time is used in South American travel. I had a card from him in November, indicating that his address until further notice would be in care of Dr. Theodore I. Gandy, Chief of Field Party, Division of Health and Sanitation, Institute of Inter-American Affairs, Casilla 13120, Santiago, Chile. — Albert C. Schweizer was the subject of an item in the class notes for December, 1948, which reported that he was chief of the political division of the American Military Government in Bavaria. I am sorry to report that he died in Munich on October 10 as a result of injuries suffered in an automobile accident. Schweizer was an architectural and city planning expert and had been at the Bavaria post since late 1945. He leaves a widow and two daughters.

Plans are being developed for a war memorial at M.I.T. to those who died in the service of the Allies during World War II. The Institute has records of the following members of the Class of 1923 whose names should be included in this memorial: Alva Franklin Englehart, Robert Walton Fleming, and Henry Maston Mullinnix. If any reader of these notes knows of someone else whose name should be included in this list, please let the Secretary know. See page i of this issue for listing of other Alumni. — HORATIO L. BOND, *Secretary*, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

## • 1924 •

Hope you didn't miss the latest literary output of one of our classmates in the last Review. Julian Joffe took "Gossip" apart and gave it a very thorough going over. An intriguing examination of a subject not normally considered open to analytical examination. — On October 1 the Aluminum Company of America announced that they now have a new assistant chief hydraulic engineer, Boynton J. Fletcher. Fletch has been with them since 1926, and until now has served as chief engineer of the development division. During the War, that development work was mainly concerned with military applications, included among them the atom bomb project, of course.

And add to our list of top executives the name of Gordon F. Eaton. From the job of sales manager, the Ferro Engineering Company of Cleveland has bumped him up to a vice-presidency. Zack had dropped out of sight until last June when he unexpectedly turned up at East Bay Lodge, a bit heavier and less hirsute than when we saw him last, but with all of his old-time pep and truly remarkable recuperative powers. — We record with sorrow the fact that Newburyport will not have an M.I.T. mayor — not this year at least. Bossy Gillis, the old war horse, was too much for our George, knocked him out in the primaries. This is doubly surprising since the city clerk had previously announced that there were more women than men voters in the town. Can't be that Bossy has more appeal to the female contingent than George! He's still a city councillor, however, and next time it will probably be a different story.

It is the unenviable duty of the Secretary from time to time to announce the passing of classmates. This month we have lost two — Robert P. Everett and Francis LeBaron. Bob Everett was with us at the reunion and is well remembered by many. He had been with the New England Power Company in Boston for many years; at the time of his death, in insurance and real estate work. He leaves a widow and three children. Bob, who was one of George Swartz's closest friends, was with him when he died so suddenly in the fall of 1924. — Francis LeBaron, who died on September 26, was president of the LeBaron Foundry in Brockton, Mass., a family business started by his father. An alumnus of both M.I.T. and Norwich, he is survived by his mother, his widow, two children and two grandchildren.

Preliminary arrangements have already been made for another cocktail party immediately before the Alumni Banquet next June 12. That's a Monday and the place is the Copley Plaza. Those who attended last June's won't want to miss it. Only bona fide acceptance received so far is from Good Old Joe. He'll be there! — And now we head into the first full year of our second quarter-century as a class. May it bring us as much good fortune, individually and collectively, as have those that preceded it. They have not been smooth sailing for all of us, but when our record as a class (as shown in our 25-year report) is being pointed out by certain Institute officials as an example of what an M.I.T. class *should* look like after that length of time, we evidently haven't done too badly. Here's wishing all the best of things of life to every one of you, and may 1950 advance you one step nearer to your goals. — HENRY B. KANE, *General Secretary*, Room 1-272, M.I.T., Cambridge 39, Mass.

## • 1925 •

Your Secretary has recently taken over a new position as personnel officer for the Operations Research Office connected with the Johns Hopkins University. This office is located at Fort Les-

ley J. McNair, Washington, D.C. During the next few months, while Hollis is getting settled in his new job, your Assistant Secretary will endeavor to supply the notes for The Review. — In case you have overlooked the fact, by next June you will have been away from M.I.T. for 25 years; and the 25-year class occupies a prominent place in the Alumni Day proceedings. Tom Price is working on reunion plans, and Frank Turnbull, II, is representing the Class on the 25-year committee. By the time this appears in print, you may have received notification of the reunion plans. In any event, you should be reserving a few days just prior to June 11, 1950, for our reunion.

We have some news regarding members of the Class which has been supplied through the M.I.T. News Service and Alumni Office. We received the very pleasant news that Roger Ward, II, Seattle, Wash., had become engaged to Dorothy Comstock, a graduate of Windsor School and who later attended Radcliffe College and served with the O.S.S. in the Mediterranean and European areas during the War. She is now doing government work in Washington, D.C. Roger was with the 9th Air Force Bomber Command in Europe during the War. A fall wedding was planned. — We also received information that John H. Fielding, X, of the Goodyear Tire and Rubber Company in Akron, Ohio, has recently been elected vice-chairman of the rubber division of the American Chemical Society. Malcolm G. Davis, I, Vice-president of Gilbert Associates, Inc., engineers in charge of research and special studies in New York City, has recently been made a director of the New York Savings Bank.

It is with sorrow that we announce the death on August 24 of Walter G. Scharmann, X. Walter was born in New Britain, Conn., and shortly after graduation went with the Esso Standard Oil Company at its Baton Rouge, La., refinery. He was later assigned to the Standard Oil Development Company at Linden, N.J., where he has been located for 15 years. He died at his home in Westfield, N.J., of a heart attack. The Class extends its sympathy to his widow and three children.

We have a news clipping from the Newburyport News indicating that Willard Allphin, who has been commercial engineer with Sylvania Electric Products, Inc., for the past six-and-one-half years, spoke at a meeting of the Newburyport Rotary Club, recently, on the subject, "The Fluorescent Lamp And How It Works." We have information concerning Clarence B. Barron, XV, who is now located in Beaumont, Texas, where the Gulf States Utilities Company recently announced his promotion as system director of lighting and municipal sales. He will have charge of activities involving lighting sales to the community industrial concerns, street lighting, and other lighting services to the municipalities in the system. He was formerly system lighting director. — I had a very nice chat with William Blair, II. Rusty has been with the Monitor Controller Company for several years. This com-

pany, during the War, operated its plant in Baltimore, Md., but rather recently moved everything to my home town of Braintree, Mass. I have had the pleasure on several occasions of talking with Rusty on the telephone, but this is the first time since our 20th reunion that we have actually gotten together.

It will be of great assistance in making these Review notes more newsy and of interest to all members of the Class, if some of you would take a few minutes and drop a line to Hollis Ware or to me. That sort of information is much better than most news clippings. — HOLLIS F. WARE, *General Secretary*, 106 Schuyler Road, Apartment 206, Silver Spring, Md. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

## • 1926 •

Our roving class reporter was at Pigeon Cove over the week end and he really brought us up to date. Who is the roving reporter — none other than Jim Killian, and does he rove! You probably read in the recent *M.I.T. News Letter* about Jim entertaining Pandit Nehru at tea in Cambridge one afternoon at 5:30 P.M. and then attending a dinner in Newark at 8:00 P.M.! During his recent travels around the country, Jim has met many '26 men. He reports having been out to George Edmonds' home in Wilmington, Del., and also having seen Sam Homsey on the same visit. In Philly, he saw Dick Jones and Bob Richardson. When in St. Louis, Jim stayed with Dave Wells'30 and saw Dave's brother, George, who is a '26 man. In Pittsburgh, Ray Mancha got the '26 gang together before Jim's speech — Wes Hemeon, Mark Greer and Jack Larkin were there and, in addition, Jim Drain who happened to be in from Canada. On to New York for another dinner and speech, Jim met Ben Richardson, Dudley Parsons, George Leness and Pete Doelger. (Pete, incidentally, happened to come to Pigeon Cove this past week end while Jim was there, so we had a grand old get-together). Unfortunately, Dave Shepard was not at the New York gathering due to illness. Dave has been suffering from bursitis in his hip and that sounds very uncomfortable, to put it mildly. Pop Constantine, you will recall, had the same difficulty last summer with his shoulder which, as Pop described it, was bad enough. This certainly was an unfortunate homecoming for Dave and we do hope that by the time we go to press he is back in there punching again.

Jim is scheduled for many more speaking engagements between now and the end of the year and will be meeting a number of additional '26 men. He is scheduled for Detroit in late November where Gordon Spear awaits his visit. Gordon recently wrote us a newsy letter for the notes which we can quote from directly: "I have not come into contact with too many men from our Class since the War because my traveling is now quite limited. I can, however, give you a little side light on one of our classmates from India. You perhaps remember Shantanu L. Kirloskar who took Mechanical

Engineering and returned to India after graduation. His son, Chanda, is now in this country studying at the University of Maine. He hoped to get into M.I.T., but with the restrictions on foreign students, he was unable to do so. Chanda has visited us on several occasions, the last one being the early part of this month upon his return from an automobile trip throughout the west. He reports that his father is manager of a new plant in Puna, India, for the firm Kirloskar Brothers, which was founded by Shantanu's father and uncle. Chanda promises me that his father will visit this country again within the next year or so, and I may then have some further information. I met Ray Hudson last spring, and he is located in Marysville, Mich., with the Goodyear Tire and Rubber Company in charge of sales in this area for all Goodyear mechanical rubber products.

"I am still with Fisher Body Division as general administrator of sales, and this year I am vice-president of the Detroit M.I.T. Association. We are looking forward to our meetings this year, particularly in November when we hope to have Jim Killian visit us. Dean Pitre came to Detroit last spring and held a meeting with some of us of the Detroit M.I.T. Association at which meeting we interviewed seven boys who had made application for scholarship to M.I.T. This was the first occasion I had to attend one of these meetings and also was the first time I had met Dean Pitre since leaving the Institute. I remember him as the new instructor in chemistry during my first year at the Institute. I realize the work required on your part to provide class notes for The Review and assure you that I shall keep my eyes open and report any meetings with men of our Class with whom I may come in contact. I certainly appreciated your calling me last year on the occasion of your visit to Detroit and shall endeavor to contact you in Boston about next April or May, when I expect to be in the east." Many thanks, Gordon, we are looking forward to your visit in the spring but hope to hear from you again before then.

The Class is really responding to your Secretary's request for news. Elton Staples has also come through with two bang-up letters from Cleveland which we will also quote from verbatim. This quoting business surely indicates how lazy your Secretary is — or should we claim executive ability? Here are Elton's letters: "As you know, Mac Bush, Bill Sessions, and Frank Schreiner are located here in central Cleveland. Mac is statistician at the National City Bank of Cleveland. His son, Chandler, is a junior in Mechanical Engineering at Duke. He has a daughter, Polly, three, and spends his spare time as an occasional farmer in Willoughby; and says he will be able to pass out a pickle to any of his classmates who might come to visit. Bill Sessions is busier than ever in his patent law office, and his daughter, Elizabeth, is attending Hathaway-Brown. Bill had a very nice summer vacation at a dude ranch in Wyoming, where his wife and two daughters did most of the riding. Frank Schreiner has been on a motor

vacation to the West Coast with Mrs. Schreiner. He is sales manager of the Cleveland office for Pratt and Whitney. Jim Suydam has a lovely Colonial home in Cincinnati, and is supervising construction of new buildings for the Ferro Concrete Construction Company at the University of Cincinnati. Al French is very busy running the French Oil Mill Machinery Company. Al has a fine family of three children and is active in many civic affairs.

"My work with the Hevi Duty Electric Company keeps me well occupied. My oldest son, Jim, plans to complete his studies in Course XIV at M.I.T., and Sam and Charles are in the Bay Village High School. With Miriam and Charles, I had a fine vacation at Harwichport this summer and only regret that time was too short to visit the Institute. I do hope that if you or any of our classmates are in Cleveland you will at least phone me and, if possible, plan to have lunch." Then, before the ink was really dry on this letter of Elton's, he wrote again. What an assistant secretary he has proven to be! I'll quote from his second letter: "I recently spent a few days in downstate Ohio and can give you a little additional information on Guy Frisbie and Al French. Guy is secretary of the Hobart Manufacturing Company, and in addition to the usual duties of that office, he spends a great deal of time in sales and production work. He is a very busy and valuable executive. His family consists of three lovely daughters; Patricia, who is a junior at Wellesley, and Mary and Martha who are in the Troy, Ohio, public schools. I had dinner with Al French and his grand family last evening. He has a lovely home in the Heights overlooking Piqua, and he is mighty lucky in that he can get home from his plant in about five minutes. His children are at the very interesting ages of 5, 12 and 14, and are all sailing enthusiasts. They spend their summers on a lake in Michigan where they have three boats sized to the children's abilities. Al, 3d, had a week on a 72-foot yawl this summer and is a real sailor. Al travels to the various oil producing centers occasionally and enjoys a very fine business in the vegetable oil machinery field." Many thanks, Elton, for your excellent contribution of news. Be sure to drop in when you next come to Boston.

Bill MacQuarrie answered our request for news with a nice letter from Philadelphia where he is located with the Electric Storage Battery Company. We haven't seen Bill since graduation and thought he was still on the coast until his letter came in. We quote Bill: "I was located in San Francisco from September, 1936, until May, 1948, at which time I transferred to our home office here in Philadelphia; and since I see by your letterhead that you are now connected with one of our small Wilmington neighbors. I hope that if you are ever in this vicinity you will be sure and look me up. (Mac, that's a date!) While on the coast, I maintained a rather close connection with the M.I.T. Club of Northern California, although, regrettably there have not been many members of



the Class who were located in Northern California. One notable exception was Art Sutton who is now a consulting engineer in San Francisco. Now that I am located a few miles closer to Cambridge, I hope to keep in a little closer touch with class activities, and you can depend on my being in attendance at our 25th reunion at which time I will endeavor to make up for those that I have missed in the past. Meanwhile, George, please give my best to any of the old '26 gang that you may see and remember me, particularly, to Jim Killian whom I saw occasionally in San Francisco and more recently at a dinner here in Philadelphia last winter. I trust all goes well with you, George, and that you are upholding the reputation of the defunct option 3 of Course XV in the duPont organization." Thanks to you, Mac. We hope you will continue to write to us real often.

Many thanks to the several members of our Class who contributed so much news this month. Does this give the urge to some of the rest of you out there—how about you, Dan Bloomberg, and you, Smith Turner, and Maury Ash, Whit Ashbridge, Ed Damon, George Fogg, Bill Franklin, Don King, Dick Whiting, and so on. We will be pleased to hear from any and all of you, and the Class will appreciate hearing from you through these notes. — **GEORGE WARREN SMITH**, *General Secretary*, E. I. duPont de Nemours and Company, Inc., Room 1420, 140 Federal Street, Boston 10, Mass.

#### • 1927 •

A recent letter from Bill Bingham gives us the latest news from Caracas, Venezuela: "I came to Venezuela, as engineer consultant on investigation, design and construction of dams and appurtenant works. The irrigation department of the Ministry of Public Works is engaged on an extensive program of irrigation projects. Among the interesting problems here are: a. Tropical rainfall conditions; b. Crops adapted to irrigation; c. Latin-American people, their language and characteristics; and d. Natural resources of Venezuela. Venezuela has, perhaps, 5,000 English- and American-speaking people engaged in oil and other developments here, and these have sponsored a nice development of homes near Caracas."

The New Jersey press reports that: "Lester B. Woolfenden, plant engineer of the Grasselli Works Division, Linden, General Aniline and Film Corp., was appointed . . . to serve on the New Jersey State Committee on Revision of the Professional Engineers' Law. A licensed professional engineer in New Jersey, New York and Texas, the Linden executive has been with General Aniline since 1929 when he was hired as a designer shortly after receiving his degree in chemical engineering. He is now in charge of field engineering, design, construction and repair, powerhouse and other sections comprising the engineering department of the 100-acre Linden plant. Married to the former Ethel Lester of Freehold, the couple has two sons, Glen (Cornell) 19, and Donald, 16. He is trustee of Union County Chapter, New Jersey and Na-

tional Societies of Professional Engineers, a member of the American Institute of Chemical Engineers, M.I.T. Club of N.J. . . ."

Don Campbell reports that: "It might be of interest to note that I have recently been promoted to the position of chief process engineer of the Standard Oil Development Company, the research and development affiliate of the Standard Oil Company, New Jersey." — **George W. Jacobs**, now working in Nutley, N.J., has the following information to report: "Before and during the War, I had been a project engineer in the development of the Instrument Landing System for aircraft. Am now a senior engineer on microwave research, with the Federal Telecommunications Laboratories, Inc. (International Telephone and Telegraph.) The earlier work was with a predecessor company, I.T.D.C." — **JOSEPH S. HARRIS**, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

#### • 1930 •

Ralph Rowzee spoke before the Canadian section of the Society of Chemical Industry in October at Montreal on the topic of synthetic rubber. He is manager of the Polymer Corporation, Ltd., in Sarnia, Ontario. The Austin Company of Cleveland, an engineering and construction firm, has announced the appointment of Alfred Waidelich as vice-president in charge of research. Jules Larrivee has rejoined the faculty of the University of Vermont as assistant professor of mathematics. He has served as an astronomer at the United States Naval Observatory, as mathematician at the Naval Ordnance Laboratory, and in the applied physics laboratory of Johns Hopkins University.

The first mailing concerning our 20-year reunion in June should reach you all soon. Since this reunion will serve as a dress rehearsal for the 25th reunion in 1955, we are expecting a larger turnout for the 20th than at the 10th. Please send any ideas for the reunion and a word about your recent doings to: **PARKER H. STARRATT**, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass. *Assistant Secretaries*: **ROBERT M. NELSON**, 2446 Iroquois Road, Wilmette, Ill.; **ROBERT A. POISSON**, 105 East 88th Street, New York, 28, N.Y.

#### • 1935 •

Plans for our reunion are taking shape. At a meeting called by Jack Colby in September, 17 classmates assembled to form the nucleus of the reunion committee. Principal officers are: Jack Colby, chairman; Bob Granberg, vice-chairman; Perk Ehrlich, secretary; and Luke Packard, treasurer. Subcommittee charimen are as follows: Ernie Van Ham, hotel accommodations and music; Leo Beckwith, entertainment; Dick Jarrell, sports; and Frank Sellow, artist.

To obtain the best possible publicity, approximately 50 representatives for geographical localities, courses, fraternities, and dormitories have been selected to

plan personal contacts with all classmates in each group. This publicity program should be very effective in encouraging a great many to attend the reunion and will enable fellows to arrange traveling accommodations with friends or nearby classmates. To mention a few publicity representatives, the following have been asked to plan contacts with the larger groups: Pete Grant, Gerry Golden, Irv Banquer, George Bull, Hal Bemis, Gale Forssen, Dick Shaw, George Peterson, Walt Stockmayer, Cope MacAllister, Johnnie Bainbridge, Bart Chapman, Winnie Winiarski, and Jack Hossfeld. Other fellows who have already agreed to round up delegations in their immediate localities are Jack Orchard, Ken Finlayson and Jack Best. Ken reports without details that he will be "out of the country" for a while. It appears, however, that he will be readmitted in time for the reunion. — **J. BARTON CHAPMAN**, *General Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

#### • 1938 •

Our wedding of the month is that of Margaret Elizabeth Parsons to John Russell Cooney in Damariscotta, Maine, on September 27. They took a month's trip through the Canadian Rockies and the northwestern states before settling down in Waldoboro, Maine, where John is manager of the Waldo Theatre. Congratulations, John! — There are two new additions to the ever growing next generation. Don MacDonald reports the birth of James Carroll MacDonald on July 25. And on November 9, Dale and Jeannie Morgan had their fourth, a boy, Kirk Morgan — nine pounds, one and one-half ounces. For obvious reasons the Morgans have bought a new house. The new address is 6 Avon Road, New Rochelle, N.Y.

Julius Kovitz has been appointed general manager in charge of all chemical and metallurgical operations at the Brooklyne Chemical Works, Inc., of Baltimore, Md. This company is a basic producer of copper sulphate, nickel sulphate and other metallic chemical salts. During World War II, he was a captain in the Chemical Corps stationed at the Technical Command, Edgewood Arsenal, Md. Mr. Kovitz has been associated with Brooklyne since 1941, with the exception of the time that he served with the Chemical Corps during the War. — **Frederick Hurley**, Major, U.S.A., of 7 Madison Avenue, Wakefield, Mass., formerly commanding officer of the Chicago chemical procurement district, is now attending the Harvard University Graduate School for two years. — **Thys Boissevain** writes from New York that he is back in the teaching role. He is in the Mechanical Engineering Department at Pratt Institute, Brooklyn 5, N.Y., and happy to have that piece of chalk in his hand again. Thys is still keeping his home in Kingston, Mass.

A note from the Shell Oil Company of Canada tells us Dr. William Gussow has moved his offices from Ottawa to Toronto. He is exploration manager.

The appointment of Benjamin M. Siegel, of the Research Laboratory of



Electronics at the Institute, as head of Cornell's new electron microscope laboratory was announced today by Cornelis W. de Kiewiet, acting president of the university. The new laboratory was established with a substantial grant from the Rockefeller Foundation. During World War II, Dr. Siegel was engaged in confidential military research there. Between 1946 and 1948 he set up and directed an electron microscope laboratory at Brooklyn Polytechnic Institute under the auspices of the Weizmann Institute. — Dick Muther is taking eight weeks leave of absence from his job to write a new book on "Plant Layout."

On November 29, at Patten's Restaurant in Boston, the first of what promises to be an interesting series of class dinners was held. There were 12 members of 1938 there and it is planned to have three or four of these get-togethers during the year. Thinking that it might be of interest to the Class, we secured vital statistics from those present and this is what we learned: Paul and Ruth Black live at 49 Spring Street, Melrose, Mass. He is manager of equipment development with the Sylvania Electric Products, Inc., 70 Forsyth Street, Boston. They have two children, Peter, seven, and Paula, three. Joseph G., and Mary Bryan live at 97 Green Street, Melrose 76, Mass. He is a staff member of the D.I.C. at Technology. They have two children Mary Ann, four, and Bernadette Marie, two and one-half. Severino J. Rugo of 149 Pleasant Street, Dorchester 25, Mass., is construction engineer with John Rugo, also of 149 Pleasant Street. Norman and Muriel Leventhal live at 137 Englewood Avenue, Brighton 46, Mass. He is the president of the Beacon Construction Company of 102 Hano Street, Allston 34, Mass. They have two children, Paula, five, and Mark, one. Donald and Phyllis Severance live at 13 Piper Road, South Acton. He is secretary and treasurer of the M.I.T. Alumni Association, Cambridge, Mass. Their two girls are Carol, five and one-half, and Patricia, one. Samuel and Charlotte Rudginsky live at 160 Grover Avenue, Winthrop, Mass. He is a mechanical engineer with Stone and Webster Engineering Corporation at 49 Federal Street, Boston, Mass. They, too, have two girls, Jean two and one-half, and Gail, one and one-half. John and Eileen Bethel live at 130 Vernon Street, Wakefield. He is a project engineer with Metcalf and Eddy, 1300 Statler Building, Boston. They have three children, Mary Elizabeth, five, Patricia Ann, two, and their latest addition, Lucy Frances, only 22 days. John and Mireille Glacken of 65 Foster Road, Belmont, also attended. John is an engineer with Jackson and Moreland, Boston. Their children are Jocelyn Elizabeth, two and one-half, and Gerard Alain, one month.

We also received the following information from Sol and Sylvia (Wolfson) Kaufman, who live at 48 Langdon Street, Newton. He is president and purchasing agent of the Kaufman Industrial Hardware Company of 770 Main Street, Cambridge. David E., and Marion (Bachelder) Acker live at 210 Woburn Street, Lex-

ington. He is a chemical engineer with Arthur D. Little, Inc., of 30 Memorial Drive, Cambridge. They have three children, Karl W., eight, Merrill, four, and Suzanne, eight months. Francis A., and Elizabeth Fisher live at 3 Hodgport Lane, Dover. He is sales-engineer with the U-Dryvit Auto Rental Company, Inc., at 120 Potter Street, Cambridge. Their two children are Barry G., seven and Ann, three. And, lastly, Al and Carol Wilson live at 32 Bertwell Road, Lexington. He is the general manager of the A. O. Wilson Structural Company, 40 Smith Place, Cambridge. They have three children, Raymond, five and one-half, Anita, three and one-half, and Sarah, two.

The Institute is attempting to compile an accurate list of those men who died in the service of the Allies during World War II. According to the records, there are ten men from 1938 on this list: Arthur Louis Dionne; Robert Anthony Gallagher; John Guttel; Fred Lee Lamb; Charles Robert Mills; Walter Hale Paige, Jr.; Daniel Stickley Spengler; William Thau; James Malcolm Topalian; William Thomas White. If you know of any omissions or corrections to this list, would you please let your Secretary know. Also see page i of this issue for a complete listing of Alumni who were killed in service. — ALBERT O. WILSON, JR., *General Secretary*, 32 Bertwell Road, Lexington 73, Mass. RICHARD MUTHER, *Assistant Secretary*, Methods Engineering Council, 822 Wood Street, Pittsburgh 21, Pa.

## • 1942 •

Carl Jealous, who has been traveling about the country from a base at Oak Ridge, has sent us a sparkling and informative account of his meetings with '42 men throughout the country this spring and summer. While in San Francisco, he found Tom Hicks engrossed in A.E.C. work. Tom now has a Ph.D. degree in Chemical Engineering from the University of California. Carl McGinnis is also out at Berkeley; he is seeking his Ph.D. degree but took time out to discuss old times and the view from the Top O' the Mark. Carl Jealous also reports having seen Harry Knox in Philadelphia where Harry is a promising junior executive at Exide Battery and really enthusiastic about his job. Back in Oak Ridge, Carl reports that Shep Tyree, now a professor of Chemistry at the University of North Carolina, spent the summer on the staff of the Chemistry division at Oak Ridge. He's now back at the university in Chapel Hill with his wife and two daughters. Somewhere during his travels, Carl saw a picture of Ed Yoder receiving a sailing trophy from the mayor of Galveston — Ed is now with Carbide at Texas City. Thanks for the letter, Carl; we could do with a few more from you others.

We have been informed that George Thompson has been made an assistant professor at Stanford, teaching geophysics and sedimentation. Bob Jacobson spent part of the summer helping out in an American Friends Service Committee project for building a community

center in Lima, Ohio. From the Provincetown *Advocate* we learn that Remigo S. Roda, who did graduate work at Technology, is the T.W.A. superintendent of meteorology for Europe and North Africa. Mr. Roda is based in Paris; he lives near Versailles with his wife, Amelia, and daughter Frances.

We are happy to report that Charles Cresap, who has been working for American Cyanamid and is now a graduate student at Johns Hopkins, has become engaged to Ann Kimberly Hunneman of Portland, Maine. Milton Link is engaged to Elizabeth Cramer of Cincinnati; and Bernie Levere, now an industrial engineer in the needle industry has expressed honorable intentions toward Zelda Gordon. Bill Foley married Dorothy Quinn in Dallas. Bill is an engineer with Chance Vought and Dorothy is on the nursing staff of Baylor University Hospital. — GEORGE M. KAVANACH, *Acting Secretary*, Room 4-055, M.I.T., Cambridge 39, Mass.

## • 1943 •

At long last, and for once when I have failed to write notes for an issue of The Review I have a first-rate excuse! Of course, I am thinking about last month's copy. The due date for my material was October 20, but Clinton Williams Kemp was born here in Hamilton on October 16 — and by the time I had recovered from the rigors of passing out cigars, it was too late to turn in the class notes. The self-energizing alarm clock weighed six pounds when he arrived, weighs about eight at this writing, and has already eaten up all the Kemp's profits! However, I was not the only member of the Class who popped his shirt buttons with pride in October. Two days before the arrival of our boy, that's on the 14th to be exact, Robert Groff Graves was born to Gil and Ginny Graves. Their young man put ours to shame by weighing more than nine pounds at birth.

Warren E. Foster and Mrs. Peggy E. Fenno were married in New York on September 8 at the Ritz Carlton. They spent their honeymoon in Bermuda and have returned to Roslyn Estates in Long Island. Warren is with the Hazeltine Electronics Corporation in Little Neck, Queens, N.Y. Another September wedding was that of Frances Acher and George Allen Bennett which took place in Christ Protestant Episcopal Church in New York on the 17th. The bride's home is in Winter Park, Fla., and she graduated from Rollins College. The groom is currently at the Brookhaven National Laboratory. September was also the month for the wedding of Barbara Joan Sandburg and Stephen E. Woodbury, Jr. Their wedding was held at the First Baptist Church in Beverly, Mass., on the 24th. This couple will be at home in Newton, Mass. Walter A. Boyd, Jr., and Nancy Elizabeth Wickham were married at St. James Episcopal Church in Woodstock, Vt., early in October. Peter Gratiot was Walt's best man. The Boyds spent their wedding trip in Nova Scotia and are at home now at 75 Central Street in Woodstock. Walt's bride is acknowl-

edged to be a leading ceramic designer in the States with a business in New York and another recently started, the Vermont Workshop, in Woodstock. Suzanne Norman's engagement to James A. Malloch, Jr., has been announced by her mother at her home in Brooklyn, N.Y. Jim's bride-to-be, who is a graduate from Packer Collegiate Institute and Stanford University, is working for the United Nations. Jim is with the Cutler Laboratories in Berkeley, Calif.

Walter A. Guild, Jr., Army officer, has recently returned to the United States for reassignment from Okinawa. After leaving the Institute in 1940, he enlisted in the Army at Fort Devens. He was later appointed to the United States Military Academy and graduated in 1944. During the War, he was assigned to the 1259th Engineer Combat Battalion. He returned to the States in 1946 and pursued studies at Iowa State College, getting his M.S. degree in 1947. His wife, the former Mimi J. Landis, and their two children, Judith, two and one-half, and Walter A., 3d, one and one-half, were with him in Okinawa. — The Merrimack Valley chapter of the National Association of Cost Accountants was addressed by William J. Vallette at its first meeting in the 1949-1950 season on September 13. Bill is industrial engineer for the Hytron Corporation in Newburyport, Conn. His department, which functions in both of the company's plants, is responsible for plant layout, job evaluation, and various company wage policies. "Work Simplification for Cost Reduction" was the title of his talk. — CLINTON C. KEMP, *General Secretary*, 29 Verlynn Avenue, Hamilton, Ohio.

#### • 1944 (2-44) •

News seems to be lacking in the Class these days which makes it extremely difficult for your Secretary to have class notes in each issue. Lew and Doty Tyree have a daughter, Elizabeth, as of last October. Lew is still with the Joy Manufacturing Company in Indiana. Mort Meyer is the father of a boy, Robert Lewis Meyer, born in November. He is now in Irvington, N.J. Roland Benjamin is engaged to Charlotte Conly of Swarthmore, Pa. He is working for Bethlehem Steel Company at Sparrows Point in the Sheet Mill as a special engineer. Mel Becker is also there in the engineering department. George Ziegler has left Bethlehem Steel and is with International Nickel in Bayonne, N.J. Bill Ritterhoff '47 is with Bethlehem after leaving Alcoa. He is in the mechanical engineering department.

Bob Maher married Katherine Davis of Storm Lake, Iowa, last October. John Post married Jeannette Mackay in New York. He is now employed by the Taylor Wharton Iron and Steel Company in High Bridge, N.J. Bob Buck is planning to wed June Schirmer in Waban in January. Norman Greenman married Claire Barkan in East Orange, N.J. He is with the Rogers Corporation as director of research and development. Bill Gavin and Elizabeth Moore were married in Salisbury, Md. Bill is an operator of a laun-

derette, and a partner in Gavin and Roger, Inc., auto dealers. Fred Cavanaugh is engaged to Joan Heinzelmann of Yonkers, N.Y. Fred is a representative of D. R. Squibb and Sons in Belgium and France. Carl Soderberg is engaged to Nancy Traill of Spencer, Mass. Spencer Schilling is engaged to Ruth Halvorser of Jamaica, N.Y. — WILLIAM B. SCOTT, *General Secretary*, 3916 Potomac, Dallas, Texas. MALCOLM G. KISPERT, Room 3-208, M.I.T., Cambridge 39, Mass.

#### • 1946 (2-46) •

With only a smattering of news to offer this month, the time is ripe to say again that letters (any size) and postcards of your doings remain the best supply of information for these notes. Change of address notices pour in profusely, but it takes a great deal of imagination to make copy from them. At Field Day in October, I saw Roger Bart, briefly, and met the very charming Mrs. Ted Heuchling. There are two weddings to report, David Smith and Betty Ann Loomis of Larchmont, N.Y., in September and Robert W. Northup and Jacquelin O'Connor of Lexington on October 1. Recent engagement announcements include those of Bill Peirce and Nancy Jane Wilder of Winnetka, Ill. Lou Martin and Mary Jerrema Molloy of Barrington, Ill. Lou is on the staff at the Institute and working for his master's degree. And Ken Davis and Corinne Terry Borage of Burlingame, Calif. Your Secretary had hints of this latter announcement when Ken, having been graduated from Stanford's graduate school of business administration, came home for the summer. He is now out in San Francisco working for I.B.M. The Ray Browns announced the birth of their first, a daughter, Carol Dorothy on October 1. Ray commutes from Scarsdale to the Eastern Steel Tank Corporation in Brooklyn.

Stu Edgerly, whose wedding we reported in the last edition of notes, writes to say that he and his wife are now living at 3 Glen Keith Road, Upper Glen Cove, Long Island. After graduation from the Harvard Business School, Stu worked for the Hemphill Company in Pawtucket, R.I., and now is assistant to the vice-president in charge of sales of the Fairchild Camera and Instrument Corporation of Jamaica, L.I. A letter from Ed Bean tells us that he's in his fourth and final year at the Georgetown University Law School. Ed's still working at the U.S. Patent Office, but expects to resign when he finishes school and head back East Aurora, N.Y., way. Ju Chin Chu has joined the faculty of the Brooklyn Polytechnic Institute as an associate professor. — JAMES S. CRAIG, *General Secretary*, 387 Harvard Street, Cambridge 38, Mass.

#### • 1947 •

After so long and deep a silence, it looks as though we are going to have a great deal to say now, as it appears our classmates have been extremely active professionally, and of course socially, in the last few months. Before delving into

the mass of interesting information that I have to convey to you, however, I would like to express my deep appreciation to Jim Phillips for so unselfishly taking over the task of turning out these notes while I was galivanting about overseas. I have thanked Jim personally, but I want to do it again publicly; and I'm sure the rest of the Class joins me in saying "much obliged, Jim." As a matter of fact, I lunched with Jim just a few days ago in the remarkable cafeteria of the John Hancock Building. Jim is now with the Group Sales Department of John Hancock, which he joined some months ago after his two-year sojourn in the Dean's Office. He's living up in Manchester, Mass., right on the sea, and tells me that Janie and the two boys are very happy in these, apparently, ideal surroundings — as is Jim, of course.

The environs of Boston must have some strange attraction for our classmates, for in the first week that I was back, I bumped into more '47 men than you can shake a stick at. Norm Holland is very much the Harvard man finishing up this year in law — you should see that short haircut of his. Jack Rizika is also at Harvard (both are living in Perkins Hall), and is working on a Ph.D. degree in applied science; and is also being influenced to the extent of rooting for Harvard in the football games. Joe Devaney came in and said hello in the basement of Walker one lunch time not so long ago. He is back at the Institute brown bagging for that all-important doctor's degree in Physics. He tells me that Steve King is working in Connecticut, just where, though, he didn't say. Fred Ehrich is also back at Tech — living in the Graduate House — and is preparing to run the gamut of degrees from S.M. to Sc.D. in Course II. He explained that his year at the University of Delft didn't gain him much academically, but he had a fine chance to see Europe. He just recently arrived back in the country. Larry Michel is hoping to receive his S.M. degree in Chemical Engineering at the end of the current term, whereupon he is going to take the fatal step. He's been working part time doing research of some sort, and is still actively interested in Tech Show which really appears to be a going concern these days. Larry gave us the news that Jim Burns got married some time ago, and that Bob McBride is living (and presumably working) in Framingham.

Marv Sweeney, who married Virginia Rogers very recently, is a veritable news bulletin in himself. He is still engaged on hush-hush research with the Supersonic Tunnel where he's been since graduation. Marv gives us the word that Vin Haneman is back in school — this time at the University of Michigan; Dave Clapp is teaching, of all things, at Moses Brown School in Providence; Phil Gordon is working for I. Miller Shoes in Wilkes-Barre, Pa.; Ted Dyett for H. H. Scott in Cambridge; and Walt Weeks is with Union Carbide and Carbon in New York. The Supersonic Lab seems to have special advantages as Howie Zwemer, Dave Knodel (married a year now), Al Steinmayer (also married), Art Roberts, Stu Broderic, Ted Garber, Oiva Anderson, and Jack



Hill are all giving aerodynamic research their all there. Jack Hill informed me that Dick Seaman is taking a doctorate in Textile Technology, and is back at the Institute complete with wife and child (male). Also Homer "Yohay" Eckhardt, 6-45, has taken himself a wife which is good news, indeed. I wish all these people would honor us with a missive sometime so that we won't have to depend on secondhand information for their whereabouts and doings. Take a lead from Bryant Williams who dropped us a card, albeit some time back, telling us that he'd like his friends in VI-5 to know that he now possesses a master's degree in M.E. from the Stevens Institute of Technology. Congrats, Bryant, and thanks for the card—that's all it takes, just a penny post card. As a matter of fact, while I was overseas I did receive letters from a number of classmates, and although the news may be a little old, here is what some of them were doing as of last spring.

Bob Hildebrand, 6-45, is with Boeing in Seattle, working on the design of axial flow fans and compressors. Wife Ginny Ferguson Hildebrand is at the University of Washington working on cancer research, and they both seem very happy out there. Bob writes that his future plans include the possibility of taking a doctorate at Cal. Tech., and some day teaching in the field. I am told Bob and Ginny were east some weeks before Thanksgiving on a vacation. Charlie Bauer wrote to me in England last February, but I haven't heard from him since. He was then with the Bureau of Standards in Washington, as a chemical engineer. John Contegni was also in the Capital but, apparently, has since been transferred to New York. Art Schwartz wrote that he was with the Air Reduction Company in New Jersey, but was on the lookout for another position—maybe he has it by now. As of that writing Art tells us that Lee Hanower was with Esso Standard of New Jersey. Danny Carnese, a February graduate, is with the Piasecki Helicopter Company in Philadelphia, and last summer helped his aerodynamic department softball team to lead the intracompany league. Another fellow Course XVI man who wrote a long letter was Jim Van Meter. Jim is with United Aircraft in East Hartford together with George McLafferty, and both are engaged in research projects with their firm. The most recent letter I had just before leaving England was from Arnold Judson, now doing industrial relations with the U.S. Rubber Company in Providence. Arnold married June Brenner (no relation) of North Easton last June, and after a brief honeymoon in Bermuda settled into happy domesticity in Providence. Of his present position and future plans Arnold writes: "This job is good for many laughs for one in a more detached position—not me. June finishes up at Pembroke next June, so by the winter I'm going to start negotiating for a new job, either around New York or, perhaps, South America."

Now we come to the all-important "Life Moves On" department. Engagements this month are relatively few, but wait 'til you read the list of nuptial events.

Roughly, in order of their announcement, there are the following engagements to report: Bill Latady to Nancy Elder Heath of Chestnut Hill; Burt Kahn to Betty Ann Kracke of Lawrence, N.Y.; Dan Lord to Norma MacMullen of Yonkers, N.Y. (Dan recently completed two years of graduate work in leather technology at Lehigh University); and Larry Shutzer to Miriam Bloomberg of Swampscott.

Weddings go all the way back to last May when Norton Pierce married Alice Davis of Boston; Alex Ward wed Margaret Ann Wood of Roxbury; and Don Guy married Kathleen Atherton Clarken of Brentwood, Calif. June events, somewhat more numerous, are the weddings of John Truxall to Doris Teresa Mastrangelo of Cambridge; Bob Carpenter to Signe Katherine Broch of Wilmington, Del. (Bob has been director of the City Plan Commission of Fort Wayne, Ind.); Al Draper to Lois Jeannette Lipa of Syracuse, N.Y.; Gene Gettel to Gertrude Nightingale of Newton Highlands; Al Barsa to Gloria Rosemary Trabuli of Brooklyn, N.Y. Al Petschek to Marilyn Adiene Poth of Scarsdale, N.Y.; Frank Schwoerer to Lois Katharine Green of Millburn, N.J.; Hugh Flomenhoft to Lorelei Jacobs of Brookline; and Frank Walke to Anne Bailly of Auburndale.

Hrand Saxenian and Lucy A. Asadourian of Lowell head the list of early summer marriages. Hrand is an engineer with the Boston Edison Company. Ed Kane and Jacqueline Eva Roth of West Hartford, Conn.; Arnold Winslow and Grace Catherine Dillon of Malden; Fred Ham and Rose Cynthia Bader of Brooklyn, N.Y.; and Bob Seidler and Claire Steiger of Glen Ridge, N.J., are other couples who were joined in wedlock last summer. Autumn saw still more of our classmates getting involved. Dave Lull was one of the earlier fall victims, marrying Sylvia K. Moore of Detroit, Mich., on September 3. Art Zito soon followed with a Labor Day ceremony when he took as his wife Eleanor Shiel of Brookline. Art is at present a communications engineer with Emerson Radio in New York. Vance Raynsford, now with Moore-McCormack Lines, married Nancy Stafford of Summit, N.J.; Ed Sullivan, associated with his father who is operator of the Prospect Knitting Mills of Boston, wed Mary C. Hanlon of Dorchester; Ed Ghormley married Evelyn Lane McLean of Arlington, Va.; and Merritt Cooke wed Mary Marshall Toland of Malvern, Pa. Continuing, we find the weddings of Herb Anderson to Marjorie Ruth Swan of Milton; Al LaFountain to Nancy Strickland of Bay Head, N.J.; Ted LaPier to Alice Mary Ann Daley of Hastings-on-Hudson, N.Y.; Mitch Keamy to Edith E. Hassey of Lawrence; Walt Cole to Elsa Hurlbut of Stonington, Conn.; Pete Schwab to Madeleine Renee Guilfoyle of Brooklyn, N.Y.; and Paul Kiefer to Sheila C. Job of Hobart, Tasmania, completing the events of the fall.

One very fine advantage of having this job is that it gives one an opportunity to talk about oneself. I hope you'll forgive me for belaboring you with tales of my peripatetics; but as you may obviously surmise, I am now back in the

United States and at the Institute, of all places, after 15 months overseas. I spent three months at home in Johannesburg, and then journeyed to England where I worked as a junior aerodynamicist with the de Havilland Aircraft Company, Ltd. I managed to sneak in a quick trip to the Continent, and spent a few idyllic days at Cannes on the French Riviera. There I met Jim Goldstein, 2-46, lolling on the beach with his wife; and I spent a day in London last August with Dick Cotton '49, who started with our Class back in the summer of '44. Now I am with a D.I.C. project at the Institute, and on my first day back was greeted by Tim O'Brien who has been with the project since graduation, and Bob Warner who is back for a master's degree after two years with Chance Vought. I expect to be in these parts for a couple of years, so how about some of you (I don't expect 100 per cent returns) dropping me a letter, card, or what have you, to the address below, indicating what you've been doing and where? Please write.—CLAUDE W. BRENNER, *General Secretary*, Room 23-130, M.I.T., Cambridge 39, Mass.

## • 1948 •

We have received word that Dick Sweeny has become engaged to Jean Mower, Dave Brown to Emily Louise Goedecke, F. Mansfield Young to Jean MacKensie, Leon Groisser to Lilah Horn, Edward Mason to Barbara Jean Earley, and John Clifford to Mary Virginia Lawless. News of recent marriages include announcement of the wedding of Bill Hart to Marie Therese Reardon, Don Noble to Nancy Nowack, Bob Jenkins to Hildegard Ditchett, Fiorenzo Losco to Antonia Harmady, Bob Mayne to Dorothy Lucille Mulvehill, Russell Gwillim to Elda Ewing, Bill Riordan to Mary Fennessy, John Banks to Charlen Smith, and finally, your Assistant Secretary, Dick Harris, to Rosemary Marble.

Apparently, it's like Old Home Week up at Harvard Business School; for just the other day, we received a letter from Harry Jones who reported on the doings of some of our classmates (in addition to those written up in earlier notes) at this "West Point of Capitalism." Ron Kallman and Marv Asnes '49, like Harry, are first year men; and Hal Field, actually a student at Yale Law School, has been observed on occasion spying about the 'arvard campus. Harry, when he is not doing cases, "due 9:00 P.M. every Saturday," has been working on the yearbook and learning some new after-dinner speech jokes at the Rostrum Club. Ray Ellis, too, is continuing his studies in the Boston area. He has been granted a \$1,000 Monsanto fellowship to further his studies in organic chemistry at the Institute. From D. Dennis Allegretti comes the following: "I am performing the duties of a patent examiner at the United States Patent Office during the daylight hours. Come darkfall, I romp at the law school of Georgetown University."

Three of our classmates have gone with the Griscom-Russell Company in New



York: Don Noble, Tom Scanlan, and James Fong. Don, who was formerly with the Wright Aeronautical Corporation in the combustion air and heat flow division of the research department, is now in training as a sales engineer; while Tom does field service work on all their many types of heat transfer apparatus. Bill Hart, whose wedding was announced above, does chemical research on inorganic colors and the sales and production problems involved therewith for the Imperial Paper and Color Corporation. Before his marriage, Bill played a good bit of golf. Another Course X man from whom word was received is Al Baum, who is a shift supervisor in the production section of the sterile techniques department for Merck and Company. Al has recently had a stroke of bad luck, having received both a fractured skull and a broken right arm in an accident at work. We didn't realize before how hazardous a supervisor's job could be. Frank Viera is with Uncle Sam in Washington as an electronic scientist doing research and development on guided missiles in the National Bureau of Standards and is studying evenings at the University of Maryland. Apparently most of his spare time is spent with his '49 Studebaker. Clark DuBois, he reports, is with the Brown Instrument Company in Philadelphia as a development engineer. Leon Mark, also, is with the government: as an assistant project engineer in wind tunnel aerodynamics.

Other brief occupational notes came in from Leo Celniker, who is with the Fairchild Airplane and Engine Company in Oak Ridge; Don Ross, doing research and testing on magnetic amplifiers for the Vickers Electric division in St. Louis; Paul Krasner, a sales engineer for Silway Lighting right in New York City; and Dick Baum, developing electronic analogue computers (?) for Goodyear Aircraft Corporation. Chuck Licht does plant layout and maintenance design for American Steel Foundries in Chicago; and has been seeing the mid-west and its many natural beauties. James Leon is in Cleveland as a statistical quality engineer for Thompson Products. Evenings that are not spent in learning (as a graduate student in Industrial Engineering at Case) are spent in teaching (as assistant instructor in Quality Control at Fenn College). James is also a father of three months (at this writing) and flies week ends with a Marine Fighter Squadron. Another, and more recent, father is Phil Bragar, whose daughter, Judith Deborah, was four days old when he sent in his questionnaire. Phil is a foreman on the chassis assembly line for Kaiser-Frazer out in sunny California. Rolfe Glover, we learn from his mother, has been studying in Europe since June, 1948. He is currently at the Georg-August Universität zu Göttingen; and is traveling, mountain climbing, and skiing in his idle hours. Martin Billett is with the Southbridge Finishing Company in Southbridge, Mass., to learn the cotton printing business from start to finish on a one-year training program. He reports having

met Norm Kreisman at Technology, where the latter was checking on industrial opportunities after spending the summer studying biology and organic chemistry.

Bob Wofsey is doing methods engineering work in the home office of the Metropolitan Life Insurance Company in New York. He writes that the methods work with paper work operations is now in the stage of its development similar to that of factory methods work at the end of World War I. Robert Ferens writes that he is now an assistant professor of Architecture in the School of Architecture and Allied Arts at the University of Oregon. His work involves teaching courses in upper division architecture design and basic design. During the past months he was joined by Stanley Bryan and, in August of last year, Wendell Lovett visited him in Seattle. Stanley Bryan writes that he is working for the Oregon State Board of Higher Education as an assistant professor at the University of Oregon. He also writes that he has seen Bob Ferens and Wendell Lovett. These two questionnaires support each other very well.

Richard A. Snow is now living in Marblehead, Mass., and is employed by the Hood Rubber Company. His work is in the production of tennis shoes, and he is responsible for seeing that production runs properly and that new models are introduced successfully. He reports that Ken Bushway works with him and that he has been in contact with Norm Rosen, Bill Revoir, 6-45, Jack Clifford, and Francis Dean, 6-45. John R. Kearney is working at the Corning Glass Works on glass technology. He has been working as a technical assistant in the various branch plants where there are melting departments. John writes that Charlie Colgan worked for Corning until a few months ago when he left to attend the graduate school of the University of Utah. Jess Dew reports that he is working for the Stanolind Oil and Gas Company in Tulsa. His work deals with evaluation of the chemical processes used to separate chemicals from natural gas. Bob Maher, 2-44, and Carl Minden '47 work with him at Stanolind. — WILLIAM R. ZIMMERMAN, *General Secretary*, in care of Kurt Salmon Associates, Inc., 3000 Albemarle Street, Washington, D.C. RICHARD H. HARRIS, *Assistant Secretary*, 19 Lancaster, Street, Worcester, Mass.

## • 1949 •

While rattling about Boston this fall I ran into a number of '49 men: Paul Schneeloch was selling glassware at the annual glass exhibit at the Parker House. Summers Hagerman slept overnight on my couch. He and Tom Toohy have set up bachelor's quarters in Cincinnati while working for Proctor and Gamble. Lee Eddison and William Jones were in search of jobs after a summer of traveling. Lee had just returned from Europe and Bud motored out west. Jim Ryder and his wife have set up housekeeping off Harvard Square.

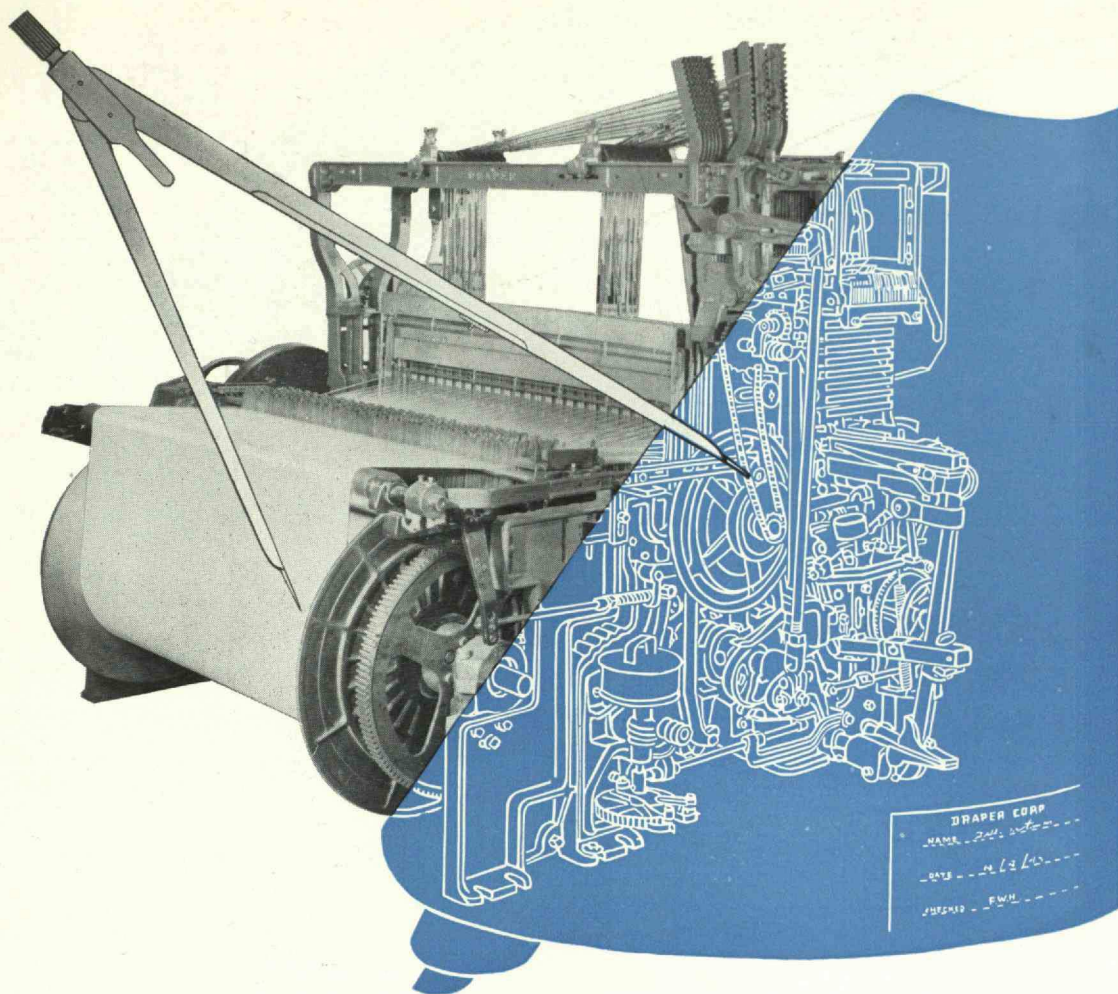
I received a clever announcement of a

"20-inch long, black haired, super strengthened female addition by the name of Sandra Louise" to the home of Jack and Anna Stevens. Congratulations! Jack and Jack Cook completed the loop course and are now living in Bethlehem working for Bethlehem Steel. — Professor Uhlig forwarded a letter he received from Pete Noss. Pete is "well on the way to becoming a dyed-in-the-wool Californian — started trainee course in Union's new inspection and control laboratory at Wilmington — sharing a rooming house with a group of other young engineers in Long Beach."

Paul Bercow was appointed assistant to the executive head of the Standard Chlorine Chemical Company and the Standard Naphthalene Products Company of Kearney, N.J. Dave Hardin is working for a master's degree in business at Chicago University. Tom Pickett is affiliated with Rangertone Corporation of Newark, N.J. Jack Baker was sent by the Saco Lowell Company of Maine to Rockingham, N.C., to gather on-the-spot information on cotton mills. Emerson Callahan is a member of the advanced communications training program of Bell Telephone. Wallace McKinnon entered Boston University to study for a master's degree in mathematics. John C. Miller is with the Formica Company of Cincinnati. Bill Stoney and William Schneider have joined the technical staff of the Langley Aeronautical Laboratory of NACA at Langley Field, Va. They are both living in Hampton, Va. Charles Townsend is with Eastman working in their testing department.

Engagements: Frederick Beutler to Elaine Caplan of Roxbury. VanTuyt Boughton to Elizabeth Renick of Plainfield, N.J. He is with Dewey and Almy Chemical Company, Adams, Mass. Murray Glauberman to Lenore Sandler of Brighton, Mass. Joseph Hadzima to Katharine O'Meara of West Roxbury, Mass. He is stationed with the Sacramento Corps of Engineers in California. Robert Hair to Millicent Hecht of Boston. Lawrence Holt to Jane Knight of Melrose, Mass. Richmond Perley to Alice Robinson of Walton, N.Y. Rush Taggart to Dorothy Harris of Cheshire, Conn.

Weddings: Thomas Rush Brown, Jr., to Helen Mason in South Sudbury, Mass. John Anderegg and Gregor Meyer ushered. They will live in Longview, Texas. James Critser to Mary Lurvey on September 17. They will live in Franklin while Jim works at Technology. J. Arthur Matey to Harriet Johnson on October 15 in North Woodbury, Conn. They will live in Irvington, N.J. Norman Stolz to Shirley Hill on October 8 in Lexington, Mass. Burt Mendlin was best man and Henry Hirschland, Hermann Allen, and Everett Morey ushered. They will live on Beacon Hill, Boston. Daniel Tiffany to Nancy Worth on September 9 in New London, Conn. Richard Davidson was best man and John Christian and Robert McConaughy ushered. So went the fall. — CHARLES W. HOLZWARTH, *Secretary*, Morris C-36, Harvard Business School, Soldiers Field, Boston 63, Mass.



The development of an idea calls for "know how." Skilled textile engineers in our Experimental and Engineering Departments must spend many long hours designing, proving and finally adapting the new ideas for mass-production. Their continuous search for new and better developments carries out the Draper policy—retaining leadership through research.



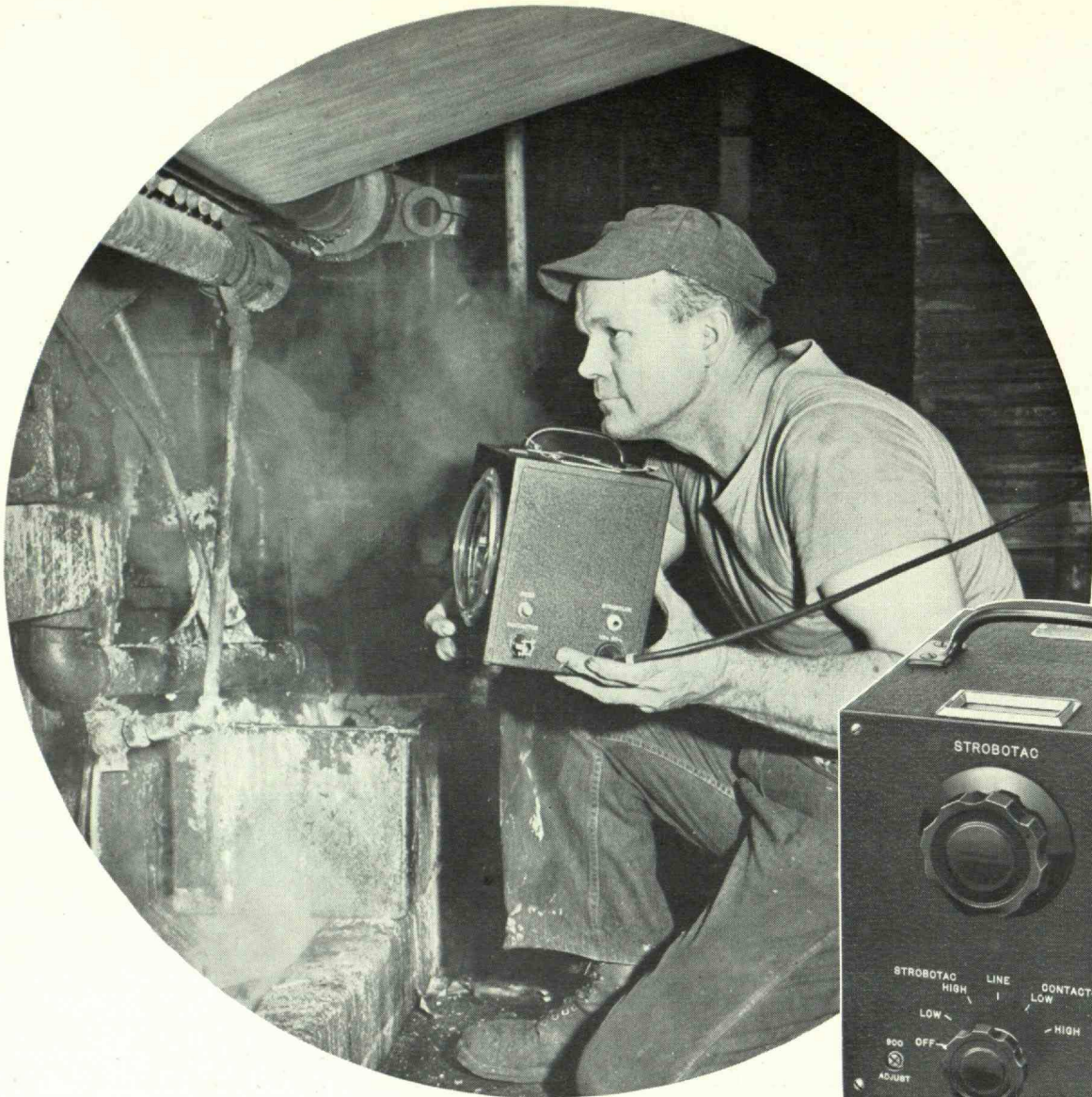
**DRAPER CORPORATION**

Atlanta, Ga.

Hopedale, Massachusetts

Spartanburg, S.C.





## Looking for a Possible Variation in the "Fluff"

Precision in the making of corrugated shipping containers is as essential as in the manufacture of the thousands of products these containers carry safely to their destinations. In the mills of The Ohio Boxboard Company at Rittman, Ohio, the Strobotac checks several manufacturing operations, not the least of which is shown above. Here are the how and the why in their own words:

"The beam was focused on the single facer where the corrugated medium (.009" straw) left the flute roll and "fluffed" out on the fingers before the adhesive is applied. The "fluff" must be uniform to achieve uniform adhesion, otherwise blisters will form. Even though we had to use a double image, due to the frequency being about 360 per minute, we were able to spot faulty finger adjustment which resulted in blistered board. By use of the Strobotac we were able to correct faulty adjustment very quickly."

Here, as in hundreds of instances, the Strobotac flash, by "stopping motion," reveals conditions and causes, effects and defects, previously hidden or obscured.

## TYPE 631-B STROBOTAC

**Direct-Reading Flashing Speed Range:** from 600 to 14,400 per minute—stops motion from 100 to 100,000 rpm.

**Flash Duration:** between 5 and 10 microseconds.

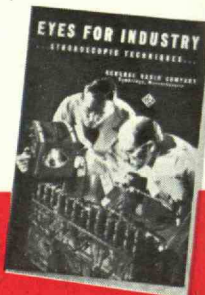
**Power Supply:** 115 volts, 60 cycles.

**Power Input:** 25 watts.

**Dimensions:** 7½ x 8¾ x 9⅝ inches.

**Price: \$125.00**

Write for your 24 page manual of stroboscopic techniques, "Eyes for Industry."



# GENERAL RADIO COMPANY

Cambridge 39,  
Massachusetts

90 West St., New York 6    920 S. Michigan Ave., Chicago 5    1000 N. Seward St., Los Angeles 38